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[FROM THE EDITOR

Conspiracy Theories and Incredible Tales

We lead off this issue with a two-article section on Conspiracy Theories and Incredible Tales, a timely look at thinking and behaviors that are at the root of many modern claims and confusions. Nearly every day's news brings new evidence of conspiratorial thinking or word of someone embellishing the truth about their own lives and obsessions.

Jeffrey S. Debies-Carl, an associate professor of sociology at the University of New Haven, shows how social science research can help us understand conspiracy legends. He begins with last year's notorious "Pizzagate" incident in which a young man shot up a popular Washington, D.C., pizzeria after being persuaded by online conspiracy-promoting sites that something nefarious was going on there. Preposterous as this series of events was, it typifies how conspiracy theories work. Folklorists see stories like the one that appealed to this troubled man as a legend, in which the events are presented as possible, even if they are bizarre and not necessarily plausible. No firsthand witnesses can be found. Multiple versions surface with varying details. Their lack of credibility isn't necessarily obvious. The Internet supplies an abundance of sympathetic websites and posts that seem to confirm the weird claim. Conspiracy theories are notoriously resilient to criticism, as sociologist Ted Goertzel made clear in his 2011 Skeptical Inquirer cover article "The Conspiracy Meme." Debies-Carl notes that psychological research shows how difficult it is for people to admit they were wrong once they have strongly committed to a belief or course of action. And action, not just talk, is regrettably sometimes the result, a form of "legend-tripping." As he notes, "Legends, like fake news, can lead to real-world consequences."

In "Becoming Fantastic," Eric Wojciechowski, a writer trained in psychology, explores why some people embellish their already accomplished lives with incredible tall tales. His concern is not just exaggerations but imagined narratives that stretch to the realm of the fantastic. His examples come from the field of UFOlogy, with people like Philip J. Corso, Robert O. Dean, and Steven M. Greer. They all were accomplished figures (the first two in the military, Greer in medicine), yet they all tell stories about themselves that seem incredible. We cannot know for certain why, but it does make their lives seem more exciting. The examples of these well-known people seemingly making up things can be multiplied many times over by lesser known figures doing the same.

The rest of the issue is our typically rich mix of topics. We offer five timely reviews, including our first-ever pictorial film review, courtesy of skeptic and artist/illustrator Celestia Ward. Bertha Vazquez answers ten questions about evolution, Stuart Vyse reports on a near-forgotten pioneer science communicator and also on the effort to raise the bar of "statistical significance" in science, Brett Taylor examines "Hollywood Curse Legends," I give some of the facts behind the Roswell UFO myth, and Amy Kelly tells her very personal story of how her skeptical thinking saved her special-needs child.

—Kendrick Frazier

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The 2017 Climate Science Special Report: Excerpts from Key Findings

Here are key excerpts from the Executive Summary of the U.S. Global Change Research Program Climate Science Special Report.[1] This is the final 669-page draft report on climate change prepared by scientists from thirteen federal science agencies[2] that was in the news in August when it was released unofficially (leaked to *The New York Times*) because of fears that the Trump administration might suppress it. The report is part of the National Climate Assessment, congressionally mandated every four years. The graphics shown here are from the report.

—*The Editors*

Executive Summary

New observations and new research have increased our understanding of past, current, and future climate change since the Third U.S. National Climate Assessment (NCA3) was published in May 2014. . . .

Since NCA3, stronger evidence has emerged for continuing, rapid, human-caused global warming of the global atmosphere and ocean. This report concludes that "it is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century. For warming over the last century, there is no convincing alternative explanation supported by the extent of the observational evidence."

The last few years have also seen record-breaking, climate-related weather extremes, the three warmest years on record for the globe, and continued decline in arctic sea ice. These trends are expected to continue in the future over climate (multi-decadal) timescales. . . .

Global and U.S. Temperatures Continue to Rise

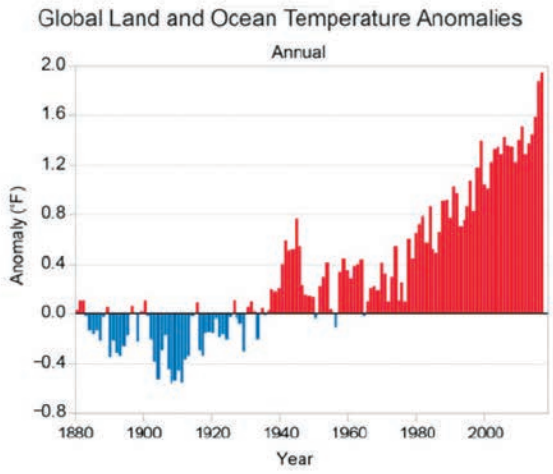
Recent data adds to the weight of evidence for rapid global-scale warming, the dominance of human causes, and the expected continuation of increasing temperatures, including more record-setting extremes. . . .

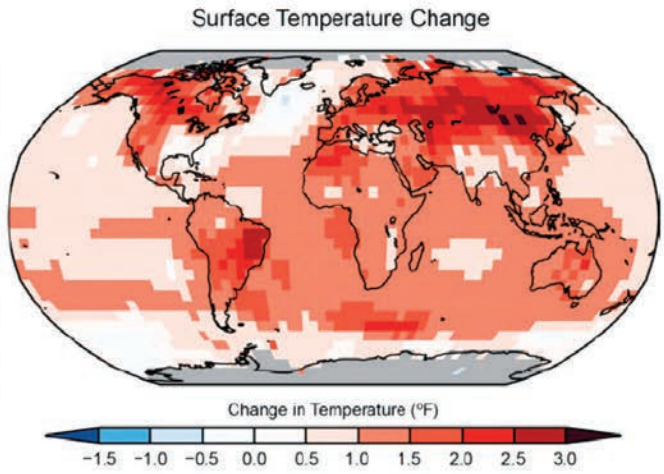
Since the last National Climate Assessment was published, 2014 became the warmest year on record globally; 2015 surpassed 2014 by a wide margin; and 2016 surpassed 2015. Sixteen of the last 17 years are the warmest years on record for the globe.

. . . Longer-term climate records over past centuries and millennia indicate that average temperatures in recent decades over much of the world have been much higher, and have risen faster during this time period, than at any time in the past 1,700 years or more, the time period for which the global distribution of surface temperatures can be reconstructed.

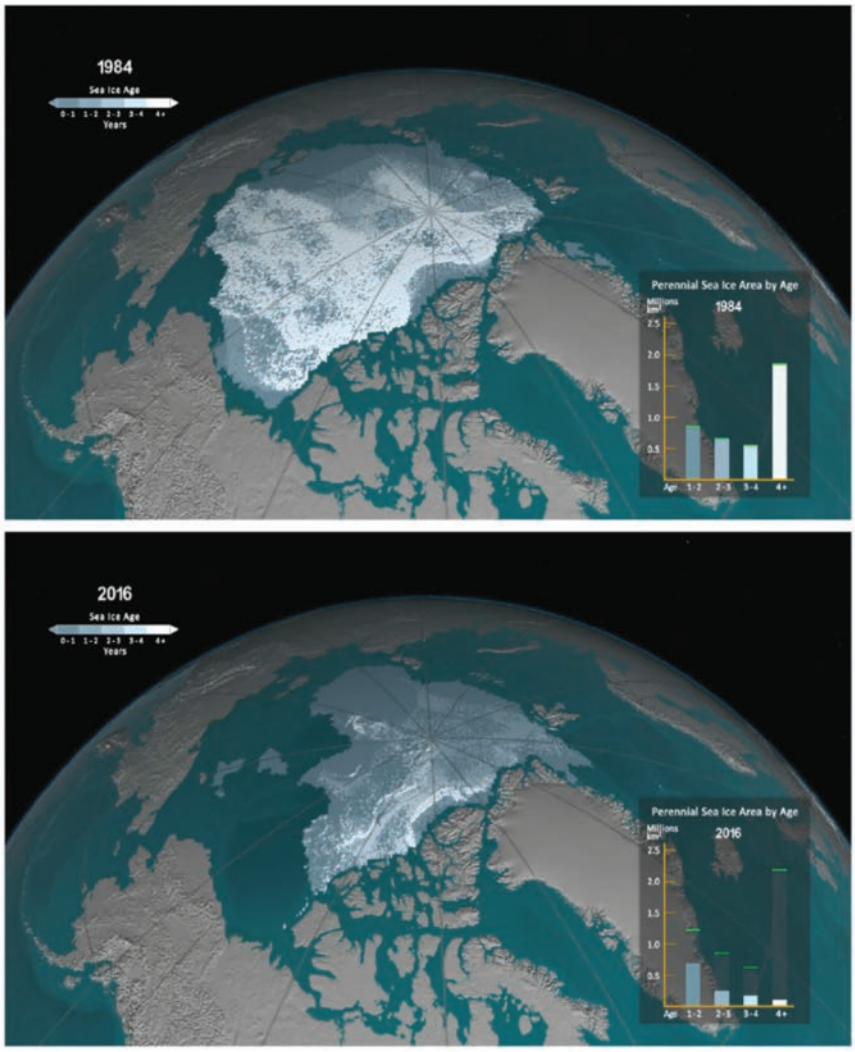
Many Temperature and Precipitation Extremes Are Becoming More Common

Some extremes have already become more frequent, intense, or of longer duration, and many extremes are expected to increase or worsen, presenting substantial challenges for built, agricultural, and

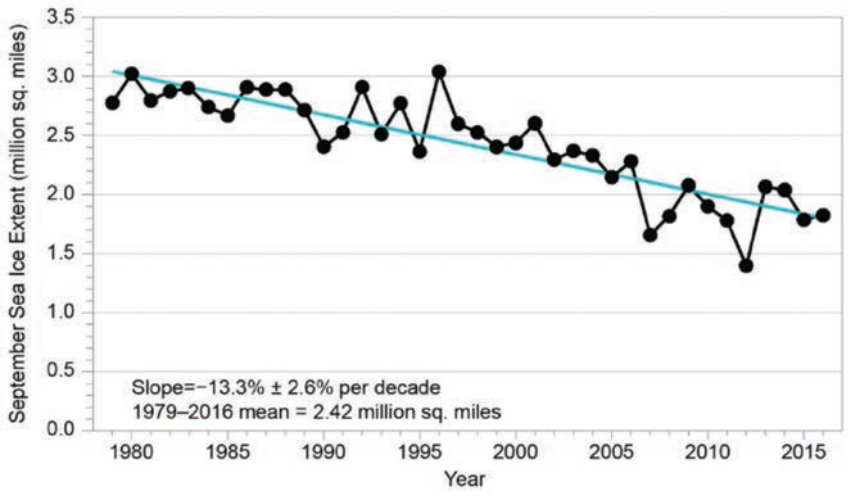




Perennial Sea Ice Area by Age, 1984, 2016



September Sea Ice Extent, 1979–2016



natural systems. Some storm types such as hurricanes, tornadoes, and winter storms are also exhibiting changes that have been linked to climate change, although the current state of the science does not yet permit detailed understanding.

There have been marked changes in temperature extremes across the contiguous United States. The number of high temperature records set in the past two decades far exceeds the number of low temperature records.

The Connected Climate System: Distant Changes Affect the United States

Understanding the full scope of human impacts on climate requires a global focus because of the interconnected nature of the climate system. For example, the climate of the Arctic and the climate of the continental United States are connected through atmospheric circulation patterns. While the Arctic may seem remote to most Americans, the climate effects of perturbations to arctic sea ice, land ice, surface temperature, snow cover, and permafrost affect the amount of warming, sea level change, carbon cycle impacts, and potentially even weather patterns in the lower 48 states. The Arctic is warming at a rate approximately twice as fast as the global average and, if it continues to warm at the same rate, Septembers will be nearly ice-free in the Arctic Ocean sometime between now and the 2040s.

Oceans Are Rising, Warming, and Becoming More Acidic

The world's oceans have absorbed about 93% of the excess heat caused by greenhouse gas warming since the mid-20th century, making them warmer and altering global and regional climate feedbacks. Global mean sea level has risen by about 7–9 inches (about 16–21 cm) since 1900, with about 3 of those inches (about 7 cm) occurring since 1993.

Human-caused climate change has made a substantial contribution to global mean sea level rise since 1900, contributing to a rate of rise that is greater than during any preceding century in at least 2,800 years. As sea levels have risen, the number of tidal floods each year that cause

minor impacts (also called "nuisance floods") have increased 5- to 10-fold since the 1960s in several U.S. coastal cities. Rates of increase are accelerating in over 25 Atlantic and Gulf Coast cities. Tidal flooding will continue increasing in depth, frequency, and extent this century.

Global Change in Alaska and across the Arctic Continues to Outpace Global Climate Change

Annual average near-surface air temperatures across Alaska and the Arctic have increased over the last 50 years at a rate more than twice as fast as the global average temperature. . . . It is virtually certain that human activities have contributed to Arctic surface temperature warming, sea ice loss since 1979, glacier mass loss, and northern hemisphere snow extent decline across the Arctic.

Limiting Globally Averaged Warming to 2 degrees C (3.6 F) Will Require Major Reductions in Emissions

Global mean atmospheric carbon dioxide (CO_2) concentration has now passed 400 ppm, a level that last occurred 3 million years ago, when global average temperature and sea level were significantly higher than today. Continued growth in CO_2 emissions over this century and beyond would lead to an atmospheric concentration not experienced in tens of millions of years. The present-day emissions rate of nearly 10 GtC per year suggests that there is no climate analog to this century any time in at least the last 40 million years.

There Is a Significant Possibility of Unanticipated Changes

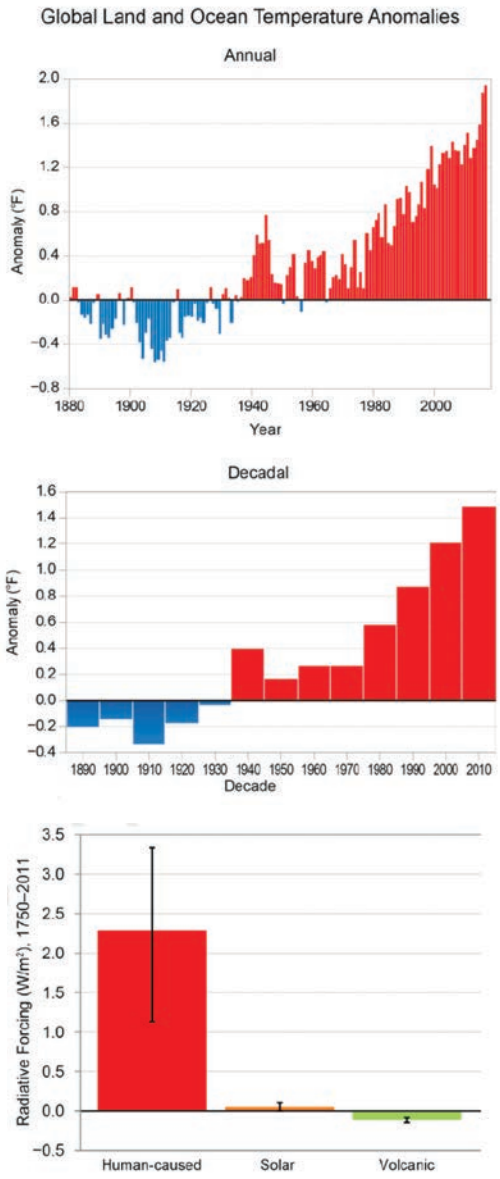
Humanity is conducting an unprecedented experiment with the Earth's climate system through emissions from large-scale fossil-fuel combustion, widespread deforestation, and other changes to the atmosphere and landscape. . . . There is significant potential for humankind's planetary experiment to result in unanticipated surprises—and the further and faster the Earth's climate system is changed, the greater the risk of such surprises.

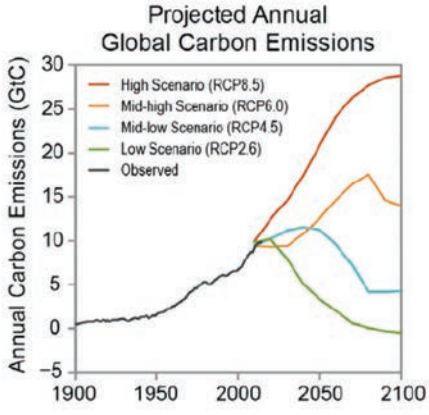
There are at least two types of potential surprises: *compound events*, where multiple extreme climate events occur simultaneously or sequentially (creating greater overall impact), and *critical threshold* or *tipping point events*, where some threshold is crossed in the climate system (that leads to large impacts). The probability of such surprises—some of which may be abrupt and/or irreversible—as well as other more predictable but difficulty-to-manage impacts, increases as the influence of human activities on the climate system increases.

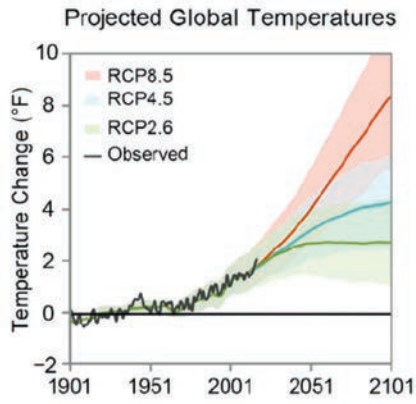
Notes

1. USGCRP. 2017. *Climate Science Special Report: A Sustained Assessment Activity of the U.S. Global Change Research Program. U.S. Global Change Research Program*, Washington, D.C. USA. 669 pp. Available online at https://assets.documentcloud.org/documents/3920195/Final-Draft-of-the-Climate-Science-Special-Report.pdf

2. The thirteen agencies are NSF, NASA, NOAA, EPA, the Smithsonian, and the departments of Agriculture, Commerce, Energy, Defense, Health and Human Services, Interior, State, and Transportation.

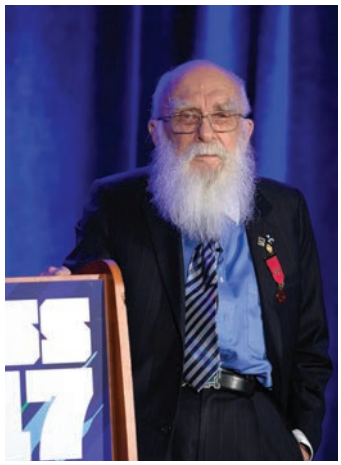






NECSS 2017: Skepticism Making Connections in Midtown Manhattan

Russ Dobler



Skeptics came out in full force for NECSS 2017. Left: Leighann Lord lent her comic talent to emcee the event. Middle: Steven Novella and Britt Marie Hermes sat on the "Is Science-Based Medicine Successful?" panel. Right: James Randi amazed yet another skeptical audience.

"Why can't we do this every weekend?" asked Leighann Lord, comedian and sometime cohost of Neil deGrasse Tyson's *StarTalk* Radio podcast, as she opened the first day of lectures at the ninth annual Northeast Conference on Science and Skepticism (NECSS). It was Lord's first emcee gig for NECSS and the meeting's first time at midtown Manhattan's Hotel Pennsylvania thanks to a fire that scorched the usual rooms at the Fashion Institute of Technology (FIT) just days before the conference was to begin. But not even an "act of God" could keep a full day of science-based medicine talks from kicking things off on Friday, June 30.

NECSS is produced by the New York City Skeptics and the New England Skeptical Society. The *Skeptics' Guide to the Universe* and The Society for Science-Based Medicine are also major sponsors.

"I was an anti-vaxxer at one point," Lord said after Gorski's presentation. "In my defense, I was three years old."

Surgical oncologist David Gorski opened up NECSS on a bit of a sad note, telling the story of Somali immigrants in Minnesota who were convinced by discredited anti-vaccine doctor Andrew Wakefield to forgo their MMR shots and were then *blamed* by anti-immigrant voices when they got sick. "They've been victimized twice," Gorski said.

The mood lightened slightly for talks from Harriet Hall on statin denialists, Steven Novella on overly hyped neuroscience, and Clay Jones on folklore in pediatric medicine. Former naturopathic "doctor" Britt Marie Hermes questioned that nomenclature, after having realized she treated sick people in Africa and elsewhere with ineffective remedies. She feels guilty now, but that only makes her more driven to expose the practice. "Now that I know better, I want to do better," Hermes said.

Pessimism and optimism collided head-on in a final panel, with the incendiary title of "Is Science-Based Medicine Successful?" Gorski lamented that "alternative" cancer treatment purveyor Stanislaw Burzynski "won't stop until he retires or dies," but Jones reported he's seeing more parents who are appalled at the anti-vaccination movement. The panel acknowledged the Sisyphean nature of their task, and Hall finally said what was on everyone's minds: "We're doing a hell of a lot better than if we weren't doing anything at all."

Making connections with people became a theme of the weekend, as emcee Lord knew just when, in person and on social media, to interject with a poignant quote or a laugh. "I was an anti-vaxxer at one point," Lord said after Gorski's presentation. "In my defense, I was three years old."

That focus actually began the previous day, which featured interactive workshops between presenters and conference attendees. Longtime skeptical activist and former Air Force pilot Steve Lundquist used his own UFO sighting as a way to relate to believers and to show that anyone can be fooled. Physicist Brian Wecht and *Skeptics' Guide to the Universe* cohost Jay Novella led a session on the art of conversation as a way to engage with those with whom we disagree.

Back in a noncharred area of FIT, NECSS got even more introspective with a panel discussing the merits of the recent

"conceptual penis" hoax perpetrated by Peter Boghossian and James Lindsay, in which the pair successfully published a fake paper in a peer-reviewed gender studies journal. *Skeptic Zone* podcaster Richard Saunders and philosophers Massimo Pigliucci and Skye Cleary wondered what the motivation of the exercise was, as it's already known that referees (in any field) can't check all of a paper's references, and that most studies end up being irrelevant and never referenced. Moderator Wecht likened the hoax to "punching down," but Cleary put a finer point on it, saying "it was mean-spirited, taking aim at a relatively new field."

Other highlights of NECSS 2017 included science communicator Summer Ash, NASA climatologist Gavin Schmidt, and former astronaut and *Big Bang Theory* guest star Mike Massimino. A panel called "Journalism in the Age of Alternative Facts and Fake News," with contributors Helaine Olen (recently) of *Slate*, Nina Burleigh of *Newsweek*, Snopes managing editor Brooke Binkowski, and moderator John Rennie, received the main conference's only standing ovation—on a Sunday afternoon, no less!

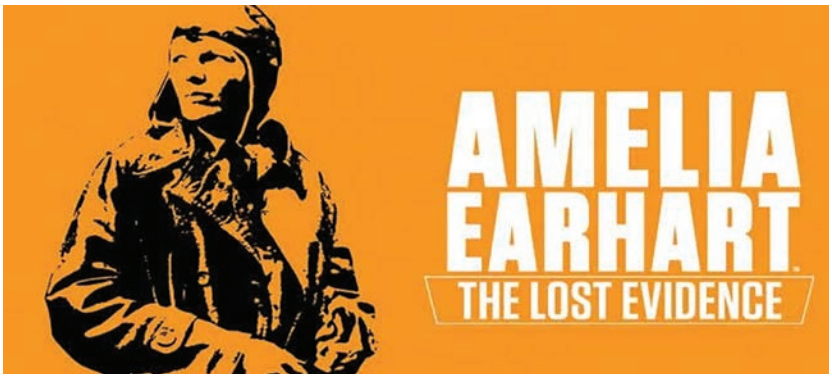
The biggest attraction for veteran skeptics may have been the special, standalone "Evening with James Randi," which was open to the public and drew a crowd upward of 600 people. The legendary figure showed he's still got it by performing an escape trick and "overdosing" on a homeopathic remedy, but he made educating the younger generation the focus of his presentation. Randi continued this thought on a Sunday panel led by entertainer George Hrab that asked what a "skeptic coming of age ceremony" would look like, when he recounted the wonder he felt as a child upon learning that to look at a celestial body, due to the finite speed of light, was akin to peering into the past.

"More kids need to be stunned," Randi said.

Russ Dobler is the science editor for the website AiPT! Comics, where he highlights the intersection of skepticism and pop culture, and a member of the New York City Skeptics. He can be found on Twitter @russdobler46.

History Channel's Credibility MIA Following Amelia Earhart Special

Benjamin Radford



The 1937 disappearance of pioneer pilot Amelia Earhart and her navigator Fred Noonan in the Pacific Ocean has been the subject of continuing research, debate, and speculation—most recently in a July 9 show titled *Amelia Earhart: The Lost Evidence*. Here is the History Channel's explanation of the show's premise:

> Buried in the National Archives for nearly 80 years, a newly rediscovered photo may hold the key to solving one of history's all-time greatest mysteries. On July 2, 1937, near the end of her pioneering flight around the world, Amelia Earhart vanished somewhere over the Pacific Ocean. . . . Now, new evidence has surfaced in U.S. government archives suggesting Earhart might not have crashed into the Pacific at all, but crash-landed in the Marshall Islands, was captured by the Japanese military and died while being held prisoner on the island of Saipan.

The much-touted new evidence is a photo found by retired federal agent Les Kinney in the National Archives apparently taken at the Jaluit Atoll in the Marshall Islands. A ship can be seen towing a barge, and there are several people on a nearby dock. The show claims that two of the people pictured are Earhart and Noonan, and another even blurrier image in the background is their plane. Much of this hinges on cutting-edge facial recognition software. If the photo is

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what it's claimed to be, it means that the "lost" pair were alive and well on a dock in the Marshall Islands in 1937. That still doesn't fully explain where they went after the photo was taken, and as noted the show suggests they were captured by the Japanese and died in prison on Saipan—a fact that the U.S. government knew about and covered up.

This idea is only one of many theories put forth over the years—and widely rejected for lack of evidence. While Earhart's precise fate remains unknown, the most widely accepted explanation is also the most mundane: they ran out of fuel and their plane crashed into the vast Pacific Ocean. In an effort to breathe life (and ratings) into a theory heavy on speculation but light on evidence, the History Channel offered what they claimed was something akin to a smoking gun: a blurry photograph of what might or might not be Earhart and Noonan.

Doubts were raised about that explanation before the show aired and quickly escalated afterward. As *National Geographic* explained in a July 11 article, "New evidence indicates that the photograph was published in a 1935 Japanese-language travelogue about the islands of the South Pacific. As Japanese military history blogger Kota Yamano noted in a July 9 post, he found the book after searching the National Diet Library, Japan's national library, using the term 'Jaluit Atoll,' the location featured in the photograph" (see https://tinyurl.com/y8s67f4r).

Instead of being hidden in a secret archive deep in the guarded National Security vaults, the image popped up on the first page of search results: "His search query turned up the travelogue, *The Ocean's 'Lifeline': The Condition of Our South Seas*, which features the 'Earhart' photograph on page 44. One translation of the caption describes a lively port that regularly hosted schooner races—with no mention of Earhart or Noonan to be found. Page 113 of the book indicates that the travelogue was published in October 1935."

This of course poses a problem because the photo was published two years

There's nothing wrong with guesses and theories—as long as they are presented as such and not all-but-verified facts.

before Earhart's final flight. Yamano said in an interview: "I find it strange that the documentary makers didn't confirm the date of the photograph or the publication in which it originally appeared. That's the first thing they should have done." The History Channel promised viewers in a July 9 tweet that "after tonight, the story of Amelia Earhart will no longer have a question mark." This prediction turned out to be prophetic; indeed, the single question mark has since been replaced by dozens of question marks—ranging from the integrity of the History Channel to the competence of its on-air researchers.

While skeptics, historians, and sensible people can revel in a touch of schadenfreude, a closer look at the show is warranted. There are surely some executives at the History Channel who—like the general public—are wondering how their program could have gone so spectacularly off the rails. Perhaps the most glaring error is over-interpreting ambiguous evidence and reading too much into what is ultimately a very limited and inconclusive data set. The photograph at the heart (and referenced in the title) of *Amelia Earhart: The Lost Evidence* is simply not good evidence of anything relating to Earhart; links to her are based purely on speculation and conjecture. There's nothing wrong with guesses and theories—as long as they are presented as such and not all-but-verified facts. Absent strong corroborating evidence, one theory is as good as the next. Add some confirmation bias and failure to question assumptions and verify facts, and you've got another cable channel failure.

The show takes great pains to demonstrate that the photograph had not been altered or retouched, which is a good first step in authentication but sheds no light whatsoever on the key issue of whether the image depicts Earhart and Noonan. There was never any reason to doubt the image's authenticity in the first place, and surely a photographic faker trying to deceive could have crafted a much better likeness of both aviators. In a statement, the History Channel said that it has a team of investigators "exploring the latest developments about Amelia Earhart" and promised transparency in their findings, concluding that "ultimately historical accuracy is most important to us and our viewers."

Benjamin Radford is deputy editor of SKEPTICAL INQUIRER magazine and author or coauthor of ten books. He has investigated—and solved—dozens of international mysteries.

The Roswell Incident at 70: Facts, Not Myths

KENDRICK FRAZIER

The seventieth anniversary of the so-called Roswell Incident came and went this past summer with a refreshing lack of fuss. One might even hope to think the passions it evokes among believers that a flying saucer crashed on a ranch in south-central New Mexico back in July 1947 have, over time, finally waned. But the rationalists in us realize that is not likely. Maybe they are just tired and will be back again after a rest.

That's kind of what happened with Roswell. It was a big story back in early July 1947 for a few days, but then when the Air Force announced that what the rancher found was related to balloon flights and not to anything more mysterious, the story disappeared from public discourse until it was resurrected again by several unscrupulous writers in the early 1980s.

From your editor's vantage point as a Roswell-watcher from Albuquerque, only about a hundred air miles from the supposed crash site, the most noticeable recent blip on the radar was an anniversary story by the *Carlsbad Current-Argus* reprinted in the July 8 *Albuquerque Journal* and titled "Roswell Incident Lives on 70 Years Later."

The largest newspaper in the state, the *Albuquerque Journal* has been noticeably free of sensationalism about Roswell for a long time. This reprinted story was a bit of an anomaly. It basically recounted the myth and various claims believers have put forth about it since but unfortunately gave no information that explains the origin story.

That moved me to write a letter to the *Journal* that, to their credit, they published as a short op-ed piece in their Sunday, July 16, edition, "Roswell Myth Lives on Despite the Established Facts." (Available online at https://www.abqjournal.com/1033584/roswell-myth-lives-on-despite-the-established-facts.html.)

In it I simply pointed out some key facts the article failed to mention. It may be worth reminding you, our readers, of those and a few others as well.

What rancher W.W. (Mac) Brazel reported finding on his ranch, sixty miles northwest of Roswell, was simply this: debris consisting of a large number of pieces of *paper* covered with a foil-like substance and pieced together with small *sticks*, much like a *kite*. And also some pieces of gray *rubber* (my emphasis). All were small. Hardly some high-tech alien flying saucer!

The reporter should have told readers what we now know (almost certainly) the debris to have been: remnants of a long vertical "train" of research balloons and equipment launched by New York University atmospheric researchers and not recovered—specifically, Flight No. 4. The research team launched NYU Flight 4 on June 4, 1947, from Alamogordo Army Air Field and tracked it flying east-northeast toward Corona, New Mexico. It was within seventeen miles of the Brazel ranch when the tracking batteries failed and contact was lost.

New York University's role in launching the "constant-level" research balloons was unclassified. In the 1990s, it was learned that the mission also had a classified purpose, called "Project Mogul," to learn whether such balloons could take highly sensitive microphones and keep them at a level in the atmosphere (the tropopause) where they might be able to detect acoustic signals channeled round the Earth from Soviet nuclear tests.

On the evening of February 8, 1995, I was present at a meeting in Albuquerque of New Mexicans for Science and Reason (NMSR) when the man who helped launch Flight 4, Professor Charles B. Moore, showed us some of what was on that flight. In 1947, Moore was an NYU graduate student,

working on the balloon launches. He spent the rest of his career as a respected professor of atmospheric physics at New Mexico Tech in Socorro.

NMSR is the local science-oriented skeptics group in Albuquerque. I helped found it in 1990, based on CSICOP's inspiration, and it has been headed for years now by physicist/mathematician and Committee for Skeptical Inquiry Fellow Dave Thomas. Thomas works in Socorro and also teaches a course on pseudoscience there at New Mexico Tech.

In addition to Thomas and me (and many others), physicist and CSI Fellow Mark Boslough told me recently that he remembers being in the audience at that remarkable 1995 evening meeting.

Moore brought with him a radar reflector like the three that were attached to Flight 4. Specifically, they were Signal Corps ML 307B RAWIN targets. It looked much like a box kite but with some angular surfaces. The sticks and metallic paper are similar to what Brazel described. The rubber Brazel noted was similar to the neoprene balloons used to carry equipment aloft. The radar reflectors contained small metal eyelets, similar to those Brazel had described on the debris he found.

Moore also provided a new and very telling detail. The reinforcing tape used on the NYU targets had curious markings; UFO believers later described these markings on the debris Brazel discovered as "hieroglyphics," implying some form of alien writing. In fact, Moore told us the tape had been purchased from a New York City toy factory and the symbols on the tape were "abstract flower-like" designs made to appeal to kids (Figure 1).

These and other established facts of the Roswell incident will of course never catch up with the charming myth. It is understandable that UFO believers and Roswell city boosters will promote the myth as possible reality (wink, wink), but, as I wrote in my op-ed, "in this day of 'fake news,' let's not be a party to that."

All these facts, and many more supporting details, have been widely available since the mid-to-late 1990s in various scholarly publications. They include a book that Charles Moore himself coauthored with two anthropology professors, *UFO Crash at Roswell: The Genesis of a Modern Myth*, Benson Saler, Charles A. Ziegler, and Charles B. Moore (Smithsonian Institution Press, 1997); *The UFO Invasion*, a Skeptical Inquirer anthology I coedited with Barry Karr and Joe Nickell (Prometheus Books, 1996), which includes David E. Thomas's special report from the July/August 1995 Skeptical Inquirer "The Roswell Incident and Project Mogul" and many other Roswell-related articles; and two U.S. Air Force investigative reports, *Report of Air Force Research Regarding the 'Roswell Incident'* (1994) and *The Roswell Report: Case Closed*, Headquarters United States Air Force, written by Capt. James McAndrew, 1997.

The NYU balloon flight assemblages were huge. The diagram Moore supplied in his talk for Flight 2, similar to Flight 4, and published in the above-mentioned Skeptical Inquirer article (Figure 2 here), requires three vertical columns to display all the components. They include three radar reflectors, various measuring instruments, and twenty-four separate balloons. Charles Moore told us the whole interconnected array extended a vertical distance of 700 to 800 feet. So the common explanation of "weather balloon" is quite the understatement.

Some additional points: The director of research for the NYU balloon-launch experiments in 1947 was famous New York University geophysicist and meteorologist Athelstan Spilhaus. I knew Spilhaus when I was editor of *Science News* in the 1970s because he then was on the Board of Trustees of Science Service, *Science News*'s publisher. I knew nothing about Roswell then. Spilhaus died in 1998 at the age of eighty-six.

Figure 1. "Abstract flower-like designs" on toy-factory tape used on the NYU radar targets.

In 2009 when his son, Fred Spilhaus, retired from his longtime position as executive director of the American Geophysical Union in Washington, D.C., he wrote whimsically that his father was the man responsible for the Roswell Incident (*Physics Today*, February 2009, quoted in the May/June 2009 Skeptical Inquirer). Athelstan Spilhaus was quite a colorful character. He is the only scientist I have ever heard of who had his own Sunday newspaper comic strip. Titled "Our New Age," it ran in color in 110 newspapers all over the world from 1958 until 1975. When President Kennedy met Spilhaus in 1962, JFK told him, "The only science I ever learned was from your comic strip in the *Boston Globe*" (see http://www.smithsonianmag.com/history/sunday-funnies-blast-off-into-the-space-age-81559551/).

If what Brazel found was so mundane, why did someone think it had to do with a crashed "flying saucer"? The reason is that the term *flying saucer* had just hit the news media for the first time. On June 24, 1947, pilot Kenneth Arnold reported a series of what he described as boomerang-shaped objects flying up and down near Washington's Mt. Rainier. He said they "flew erratic, like a saucer if you skip it across the water," and from then on the term *flying saucer* took hold, even though he never said they looked like saucers (see Robert Sheaffer, *The UFO Verdict*, Prometheus Books, 1998, p. 15). This started a media frenzy and people began looking to the skies and seeing things they'd never seen before (including over New Mexico) and reporting more "flying discs" or "flying saucers." Many possible explanations for Arnold's sighting have been

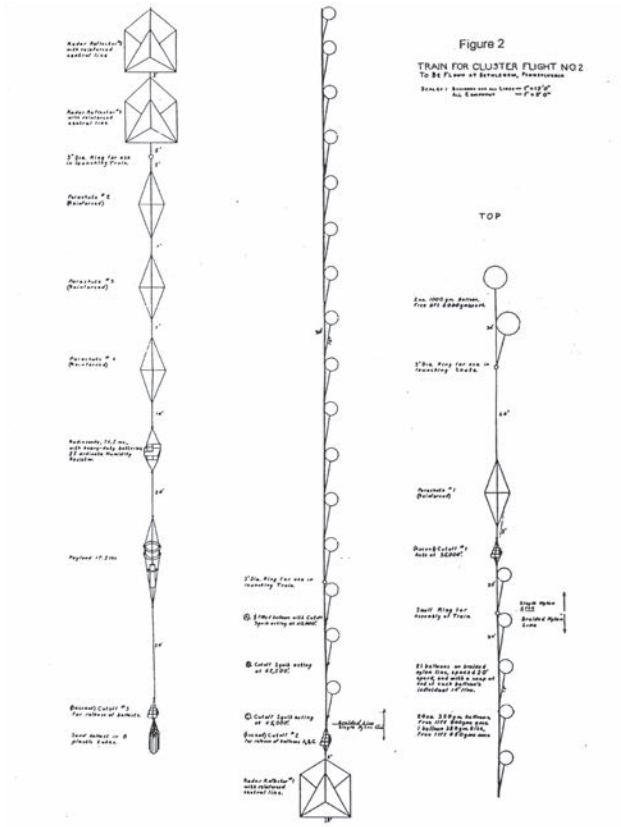
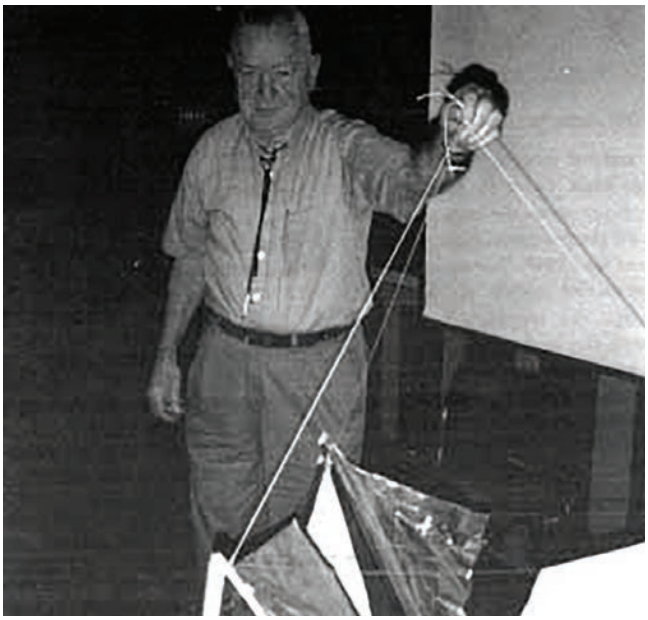


Figure 2. Diagram of balloon train from NYU Flight 2, similar to that of Flight 4, debris from which seems to have stimulated the original Roswell Incident.



Atmospheric sciences professor Charles B. Moore in 1995 demonstrating to New Mexicans for Science and Reason a radar reflector like the three that were on NYU Flight 4, tracked heading toward the ranch where Mac Brazel reported finding similar debris on June 14, 1947. (Photo by Dave Thomas)

suggested. In their May/June 2014 Skeptical Inquirer cover article "Mount Rainier: Saucer Magnet," James McGaha and Joe Nickell describe McGaha's hypothesis that it was due to optical phenomena called "mountain-top mirages." (I wonder if at least some of the "flying disc" sightings in New Mexico were reflections of sunlight off the huge NYU/Project Mogul balloon assemblages being launched fairly regularly.)

Brazel had been persuaded that the debris he had found might have something to do with the reports of "flying discs" that were then exciting everyone. His report was made public in Roswell July 8, 1947, at the height of the craze.

A public affairs officer at the local army air field was excited about the find and so made the now-famous announcement that it had something to do with saucer sightings, without further checking. That made front-page news. By then Brazel said he was amazed at the fuss and sorry he said anything about it.

Ironically, the report of what Brazel actually found, an explanation that it was a "weather balloon"(not quite right but kind of close), and the date he had found it, June 14, before the media frenzy of sightings started—all are reported in an Associated Press article published on page 2 in the July 9, 1947, *Carlsbad Current-Argus* ("'Flying Disc' turns Out to Be Weather Balloon"; I have a copy of it, see Figure 3). This is the same newspaper that unfortunately seemed to forget those facts in their July 2017 anniversary article.

In the subsequent mythmaking, one of the main sensationalist books (*The Roswell Incident*, Charles Berlitz and William L. Moore, 1980) claimed that the debris was from a flying saucer that passed over Roswell the evening of July 2, 1947. But in fact Brazel had found the debris much earlier, on June 14, just ten days after the NYU team had lost track of Flight 4, headed toward his ranch. ("This blows the whole yarn out of the water," wrote James Moseley in his *Saucer Smear* newsletter, v. 29, No. 4, May 15, 1982.)

Back then these "flying discs" didn't have the associations they have today. Nobody knew what they might be (and indeed some reports at the time did suggest that they were meteorological phenomena, or delusions, or mass hysteria, or visual misinterpretations of things seen in the skies). The idea of alien spacecraft hadn't gained hold yet. At best the concern was that if they were physical craft at all, they might be Soviet or even holdover Nazi aircraft.

In the 1980s and early 1990s, the mythmaking process really took off. More fantastic and wild stories emerged (or were concocted) in a process familiar to folklorists. Three out-and-out hoaxes were widely publicized, then exposed.

As for reports of sightings of alien bodies, the second (1997) U.S. Air Force report investigated and found there were no contemporary reports of alien bodies being found in 1947. These (unverified) reports came only in UFO books and articles published after 1978.

The Air Force report describes in detail a long series of Air Force experiments over decades in which instrumented

lifelike anthropomorphic dummies were dropped out of high-altitude research balloons over New Mexico. This began in the 1950s and continued for many years. Most were launched over Holloman Air Force Base or the White Sands Missile Range, but the balloons soon floated beyond those boundaries. The idea was to measure the effects of extreme environments and situations deemed too hazardous for a human being (page 17).

Such instrumented crash-test dummies were not familiar at that time, and the report suggests that one "very likely could be mistaken for an alien." This conclusion was widely ridiculed by UFO believers at the time, but the report gives a large amount of supporting detail and shows dozens of photographs. That explanation, to most fair-minded observers, has stood the test of time. Among the kinds of eye-witness statements that support the crash-test dummies explanation were statements such as "his eyes were open, staring blankly," "their skin coloration . . . a bluish-tinted milky white." At other times, the report says, injured airmen, some seriously so, were brought to the Roswell base after accidents, and it suggests some reports are mixed-up remembrances of those.

If what Brazel found was so mundane, why did someone think it had to do with a crashed "flying saucer"? The reason is that the term *flying saucer* had just hit the news media for the first time.

Carlsbad (N.M.) Daily Current-Argus
July 9, 1947, p. 2

PAGE TWO

'Flying Disc' Turns Out To Be Weather Balloon

ROSWELL, N. M., July 9—(AP)—W. W. Brazel, the New Mexico rancher who was originally thought to have found the nation's first "flying disc" is sorry he said anything about it.

The 48-year-old New Mexican said he was amazed at the fuss made over his discovery.

"If I find anything else short of a bomb it's going to be hard to get me to talk," he told the Associated Press here early this morning.

Brazel's discovery was reported yesterday afternoon by Lt. Warren Hart, Roswell Army Air Field public relations officer, as definitely being one of the "flying discs" that have puzzled and worried citizens of 43 states during the past several weeks.

The statement was later discounted by Brig. Gen. Roger Ramey, commanding general of the Eighth Air Force of which the RAAF is a component. Gen. Ramey said Brazel's discovery was a weather radar target.

But Brazel wasn't making any claims. He said he didn't know what it was.

He described his find as consisting of large numbers of pieces of paper covered with a foil-like substance, and pieced together with small sticks, much like a kite. Scattered with the materials over an area about 200 yards across were pieces of gray rubber. All the pieces were small.

"At first I thought it was a kite, but we couldn't put it together like any kite I ever saw," he said. "It wasn't a kite."

Brazel related this story:

While riding the range on his ranch 30 miles southeast of Corona, N. M., on June 14 he sighted some shiny objects. He picked up a piece of the stuff and took it to the ranch house seven miles away.

On July 4, he returned to the site with his wife and two of his children, Vernon, 8, and Bessie, 14. They gathered all the pieces they could find. The largest was about three feet across.

Brazel said he hadn't heard of the "flying discs" at the time, but several days later his brother-in-law, Hollis Wilson, told him of the disc reports, and suggested it might be one.

"When I went to Roswell I told Sheriff George Wilcox about it," he continued. "I was a little bit ashamed to mention it, because I didn't know what it was.

"I asked the sheriff to keep it kinda quiet," he added with a chuckle. "I thought folks would kid me about it."

Sheriff Wilcox referred the discovery to intelligence officers at the Roswell Army Air Field, and Maj. Jesse A. Marcel and a man in civilian clothes whom Brazel was unable to identify went to the ranch and brought the pieces of material to the air field.

"I didn't hear any more about it until things started popping," said Brazel. "Lord, how that story has travelled."

Brazel said he did not see the thing before it fell, and it was

TUNE IN TONIGHT—THE
Ford Showroom
Meredith Willson

Figure 3. Associated Press article published July 9, 1947, reporting that the debris rancher Mac Brazel had found on June 14 (long before the July 2 "flying saucer" sighting over Roswell) consisted of "pieces of paper with a foil-like substance, and pieced together with small sticks, much like a kite." Plus "pieces of grey rubber. All were small." (Author's collection.)

One last piece of corroborating testimony: In 2001 journalist Guy P. Harrison interviewed Joe Kittinger (Colonel, U.S. Air Force, ret.), one of the great aviation pioneers of the twentieth century. In 1960 Kittinger had jumped out of a balloon over New Mexico from the very upper edge of the atmosphere (102,800 feet, or nineteen miles). In a free fall that lasted four minutes, he reached a speed of 600 miles per hour.

Harrison was mainly interested in those kinds of real adventures, but he hesitantly asked Kittinger about Roswell. "It never happened," Kittinger said, and went on to describe the events involving the NYU balloon experiments I have reported here. "The so-called alien spaceship was that balloon. . . . A lot of people want to believe it was aliens, and they want to believe there was a big cover-up. But I'll tell you, it never happened."

What *did* happen, he said, is that these high-altitude drops of humanlike dummies contributed to the Roswell myth. "Absolutely they did. These dummies we dropped from balloons were dressed in pressure suits, so they looked unusual." (These quotes are from Chapter 13 of Harrison's excellent 2012 book, *50 Popular Beliefs That People Think Are True* [Prometheus Books], and I relate them here with his permission.)

"One time we dropped one and it fell way up in the mountains," Kittinger said. "These dummies weighed more than two hundred fifty pounds. So how do you carry one out of the mountains? We put it on a stretcher and carried it in the back of an ambulance to take away. Now if somebody is back in the weeds watching this they are going to say, 'Wow, look at that alien they have there.' We think that a lot of the alien sightings were actually us doing our work with the test dummies." ■

Kendrick Frazier is editor of the SKEPTICAL INQUIRER and observes the skies and Roswell-related events from his home office in Albuquerque.

Is Eating Vegetables Truly Safe?
An Examination into Contemporary Anti-Vaccination Arguments

CRAIG A. FOSTER

John Oliver recently criticized the anti-vaccination movement on *Last Week Tonight*. Oliver humorously pointed out some of the major flaws with the anti-vaccination view. Vaccines have saved millions of lives. There is a difference between correlation and causation. There is no evidence that vaccines containing thimerosal are unsafe. There is no evidence that vaccination causes autism. Arguments suggesting that there is no proof of vaccination safety can be used unfairly.

Kennedy's arguments, however, are pseudoscientific. They appeal psychologically but fail scientifically.

Robert F. Kennedy Jr. was one of the people mentioned by Oliver as supporting anti-vaccination. Kennedy responded to Oliver's "attack" on *Tucker Carlson Tonight*. Kennedy went to his usual playbook (Mnookin 2017). He is sacrificing himself to warn others about vaccination. He has some sympathy for existing research but questions its thoroughness. He implies that the increase in the number of vaccinations has something to do with the corresponding revenue generated by the pharmaceutical industry and refers vaguely to reports of the CDC's corruption. He suggests that there is some type of media bias against him and that he is just trying to get answers to questions.

As a psychologist, I can see how Kennedy's message pleases those who maintain anti-vaccination beliefs. I can also imagine that his message might interest moderates, possibly starting their dissent down the anti-vaccination side of the pyramid, never to return (see Tavris and Aronson 2017). Kennedy's arguments, however, are pseudoscientific. They appeal psychologically but fail scientifically. I will use a different approach to expose their false appeal. I compiled contemporary anti-vaccination arguments using Kennedy's comments on *Tucker Carlson Tonight*, on his organization's web page, and in his vaccine challenge (Foster 2017). I then applied these arguments to a different but familiar public health context. This demonstration reveals that these anti-vaccination arguments can be used to circumvent the scientific evidence and, in doing so, they can be absurdly misleading and dangerous.

The Kennedy Anti-Vaccination Argument—By Analogy

I am writing to warn you about consuming vegetables. I didn't want to get involved. I could have put my head in the sand and pretended that the problem didn't exist. I had no choice. If I could save just one child from the harm associated with eating vegetables, then it was my responsibility to protect that child. Of course, I am not against eating vegetables. I have eaten vegetables. My children have eaten vegetables. I am concerned that we might not be promoting the right kind of vegetable consumption.

Scientists will tell you that eating vegetables is safe, but there still isn't enough research to be certain. For instance, there is no study examining all of the different combinations of vegetables that people typically consume. Research suggests that eating broccoli is safe, but what about eating broccoli and carrots, or carrots and corn? We just won't know whether eating vegetables is completely safe until this kind of research has been conducted more thoroughly.

Scientists and the vegetable farming industry profit hand-

somely from telling the public that eating vegetables is good for them. According to the United States Department of Agriculture (USDA), "The value of utilized production for 2016 vegetable crops was 13.4 billion dollars" (United States Department of Agriculture 2017, p. 7). Big Farma makes even more money for every additional vegetable that people consume. In the 1950s, '60s, and '70s, government-sponsored food guides placed meat consumption on par with eating fruits and vegetables together. Contemporary food guides encourage more vegetables than "protein" (Center for Nutrition Policy and Promotion 2011). People are obviously listening. Nobody ate Buddha Bowls when I was growing up. Now, *InStyle* has included this "plant-based deliciousness" as a trendy food for 2017 (Lustig 2016).

The USDA is corrupt. Several USDA employees have been arrested for accepting bribes in return for downgrading produce (Smith 1999). These criminal acts demonstrate that the USDA cannot be trusted. Is asparagus really better for you than bacon thickly coated with brown sugar? There is no way to really know.

I just want answers to questions, but the media wants to silence my representation of the vegetable-injured community. Many members of the media eat vegetables themselves and they have a vested interest in maintaining the pro-vegetable status quo. I contacted *Anderson Cooper 360* about being on the show to discuss my concerns. At the time I wrote this commentary, they still weren't willing to have me on. Clearly, Anderson Cooper is just another mainstream talking head who is unwilling to discuss the tough issues.

This type of prejudice against anti-veggers is not limited to journalists. The concerns raised by me and other loving parents are routinely shouted down by angry pro-vegetable mobs. These intolerant attacks are unfair. We just want to have a discussion about vegetable safety and parents' right to choose.

Conclusion

This type of argument falsely conveys innocence because it seems limited to raising concerns about ensuring safety. What could be wrong with that? What's wrong is that the argument irresponsibly ignores the consequences of creating unrealistic fears about vegetation or vaccination. If people decrease or omit vegetable consumption, they are not safer. They have needlessly created a poorly balanced diet. Likewise, the alternative to receiving vaccinations is to be less vaccinated or unvaccinated. Thus, encouraging unfounded vaccination fears makes children who are subsequently unvaccinated less safe. It is comparable to encouraging parents to replace field greens with fugu and assuming that the potential ingestion of fugu poison is not really dangerous because it is natural, organic, and non-GMO.

There is, of course, one critical difference between anti-vegetation and anti-vaccination arguments. Parents who limit their children's exposure to vegetables do not affect other children directly; other children are most likely to be affected by having to pay the healthcare costs resulting from children who grew up eating too many cupcakes and not enough collard greens. In contrast, when parents withhold vaccinations from children who are ready for them, they increase the likelihood of others becoming harmed.

Anti-vaccination proponents will probably argue that the analogy does not hold because the scientific evidence surrounding vaccination is unclear. If anti-vaccination supporters want to discuss the scientific evidence supporting vaccination safety *and* the consequences of not being vaccinated, I would welcome the discussion. The evidence supporting vaccination is overwhelming and comes from a variety of sources (for appetizers see, Gerber and Offit 2009; Offit and Moser 2011; Taylor et al. 2014). Anti-vaccination supporters do not discuss legitimate scientific evidence because they do not have a legitimate scientific case. The anti-vaccination movement is therefore pressed into making pseudoscientific arguments—arguments that might convince themselves and others, despite scientific evidence to the contrary. I hope that the analogous use of these anti-vaccination arguments will alert people to their infectious nature. Eat your vegetables. ■

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The views expressed in this article are those of the author and do not necessarily reflect the official policy or position of the United States Air Force Academy, the Air Force, the Department of Defense, or the U.S. Government.

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Mystery of Mollie Fancher, 'The Fasting Girl,' and Others Who Lived without Eating

Can people live for years without food? Some have claimed to, including certain holy persons. One nineteenth-century marvel in Brooklyn alleged not only to have lived without sustenance but to have experienced a nine-year trance state, possessed clairvoyant abilities, and recovered from paralysis and blindness. She was Mollie Fancher, a woman whose well-nourished body made her seem to some even more remarkable (see Figure 1). I came across her name years ago at a spiritualist village where some of the embroidery she produced while supposedly entranced is displayed (Figure 2). Revisits there prompted me to look further into the bizarre world of the fasting enigmas, particularly Mollie herself, and to assess the authenticity of her many claims.

The Fasting Phenomenon

Extreme fasting has been practiced since ancient times in a variety of cultural forms. Here is a brief overview of some of the main types of self-starving people.

The visionary. In Biblical times, those seeking holy visions typically went into the wilderness to fast. According to Matthew 4:1–11, Jesus "was led up by the Spirit into the wilderness to be tempted by the devil," whereupon he "fasted for forty days and forty nights." Then he experienced encounters with the devil, after which "angels came and ministered to Him."

The hermit. In the early Christian Gnostic era (the first few centuries CE), hermits—mostly male—practiced asceticism, leaving civilization and subsisting on bread and water while contemplating the world's end.

The fasting saint. Spanning the thirteenth to seventeenth centuries, a fad of lengthy religious fasting developed, attracting women, the most notable example of whom was Caterina Benincasa, later Saint Catherine of Siena (1347–1380). She joined a Dominican order at sixteen, practiced flagellation, imagined torture by demons, and experienced visions. She exhibited the stigmata at age twenty-eight, though the marks conveniently disappeared, and she was left only with the pain of her "invisible" wounds (Nickell 1993, 225–226). In his book *Holy Anorexia*, Professor Rudolph M. Bell (1985) attributes Catherine's suffering to "an eating/vomiting pattern typical of acute anorexia." Being vainglorious, he says, she "starved herself to death." She was subsequently canonized. (See also *Anorexia Mirabilis* 2017.)

A very late example of this type was Therese Neumann (1898–1962), who had a surprising variety of claims: exhibiting the stigmata, weeping bloody tears, experiencing visions of the Virgin Mary, undergoing miraculous cures, and avoiding all food and drink except daily Communion. Suspicious Catholic authorities, however, found that blood would only flow from her wounds when an appointed observer was persuaded to leave the room. Tests of her urine gave expected results for the period of her monitoring but then returned to normal—consistent with resuming intake of food and drink. She refused to undergo further surveillance (Nickell 1993, 223, 227–228).

The starving wonder. The nineteenth century saw a number of supposed prodigies who claimed to have lived for years without food. Albeit religious, they were presented more as wonders than as holy persons. They included Ann Moore, "The Fasting Woman of Tutburg," who allegedly did not eat from 1807 to 1813, but who was later exposed as a fraud and confessed, and Sarah Jacob, "The Welsh Fasting Girl," who at the age of about fourteen was briefly a celebrity but then submitted to an investigative watch by a medical committee and actually starved to death in December 1869 (Stacey 2003, 205–216).

The "living skeleton." Another nineteenth-century phenomenon was represented by sideshow artists, the pro-

totype of which was Isaac Sprague, featured by P.T. Barnum. These skin-and-bones men, or "living skeletons," as they were often styled, became common in the latter part of the century but declined in the next. They were invariably male and like their counterparts, the fat ladies, made their living by an extreme response to food (Nickell 2005, 101–105). Franz Kafka featured one such skeleton man in his 1924 story, "A Hunger Artist."

The anorexic. First described scientifically in 1868, *anorexia nervosa* is a "persistent lack of appetite and refusal of food resulting from emotional conflict" (Goldenson 1970, 83–85). Once rare, half a century after flappers made popular a boyishly thin figure for women, cases of the disorder increased.

The breatharian. In 1980, one Wiley Brooks founded a cult that espoused reverting from carnivorism to vegetarianism, thence to fruitarianism, liquidarianism, and finally to breatharianism—ending eating and drinking altogether. The health cultists' faith in Brooks was badly shaken when he was discovered slipping out at night to buy junk food (Stang 1988, 33).

Mollie Fancher

The story of Mary Jane "Mollie" Fancher (1848–1916) properly begins on June 8, 1865, when the eighteen-year-old suffered a streetcar accident. On a shopping trip in Brooklyn, she stepped from the horse-drawn trolley only to have her crinoline skirt get caught and thus be dragged for almost a block over paving stones. The accident occurred just when Mollie was on the brink of marriage, and it may have been just the excuse she needed to avoid it. She had earlier been diagnosed with "dyspepsia," a catch-all term that described a variety of ills from nervous indigestion to hysteria (Dailey 1894, 14–17, 29; Stacey 2003, 17–21).

Now, although recovering from her injuries and being cared for by the maiden aunt who raised her, Mollie began to experience a textbook's fill of ailments: various pains, contraction of leg muscles, a weak arm, failing eyesight, and spasms alternating with coma-like "trance" states that lasted for hours. In addition, she suffered fainting spells, loss of appetite, and even vomiting when food or medicine was taken. Eventually, she experienced near deafness, "blindness" (while seeing "clairvoyantly" to embroider and to read books), bouts of paralysis, and so on.

By modern standards, Mollie Fancher was not anorexic—that is, did not suffer from anorexia nervosa since she was not obsessed with being thin.

When Mollie eventually came to the public's awareness, she said that she had been in a trance for nine years during which she had no recollections. Meanwhile she had undergone remarkable transformations: in addition to developing eyeless sight, she could supposedly converse with the dead and abstain completely from food. Less well known was another trait: she exhibited multiple personalities—from no fewer than five different individuals, each with their own name. In addition to a version of Mollie herself, called "Sunbeam," they were Idol, Rosebud, Pearl, and Ruby (Dailey 1894, 18–79; Stacey 2003, 44–56, 63–70).

Mollie's broader fame really began in 1878 when some of her embroidery became part of an art loan exhibition in Buffalo, New York. She was singled out by the *New York Herald* as "An Invalid Lady Who for Fourteen Years Has Lived Without Nourishment"—although it was actually twelve and a half years according to family and friends. Her personal doctor told the *Herald* that Mollie had had no solid food since her horsecar accident. He had of course been suspicious, but he could never catch Mollie secretly eating (Stacey 2003, 81–87). Not everyone was quite so easily persuaded, however, and soon the story of Mollie Fancher became a lively debate between believers and skeptics.

By modern standards, Mollie Fancher was not anorexic—that is, did not suffer from anorexia nervosa since she was not obsessed with being thin. I would put her in the earlier-mentioned category of "the starving wonder." Thus she was "emblematic of other neurotic girls of her era," as well as a harbinger of succeeding fasters (Stacey 2003, 185).

Toward a Diagnosis

Dr. William A. Hammond (1879), a neurologist, regarded such "fasting girls"—those who claimed to live without food—as suffering from hysteria.

Figure 1. Mollie Fancher, looking plump, with her aunt in 1886. (From *Mollie Fancher, the Brooklyn Enigma*.)

He thought that condition, in Mollie Fancher's case, was brought on by her accident and its aftereffects. Another critic, George Beard ("the father of neurasthenia") essentially agreed, attributing her condition to nervous exhaustion with "attacks of ecstasy, which, like catalepsy, is but another term for one of the many phases of trance" (Beard 1878). More recently, a professor of psychiatry and behavioral neurobiology, Charles Ford, concluded that Mollie likely had conversion disorder (what used to be called "hysteria"), coupled with dissociative identity disorder (the new name for having multiple personalities) (Stacey 2003, 279–284).

Figure 2. Rare Mollie Fancher embroidery at Lily Dale, the spiritualist village in Western New York, visited by Joe Nickell (behind camera) and wife Diana Harris.

Hammond and Beard had also sought to rule out trickery. That, I am convinced, should be our modern view. The evidence suggests that Mollie Fancher engaged in malingering and other deceptions—probably to opt out of reaching maturity. Her accident at nearly nineteen came just in time to keep her from a marriage she may have sought to escape. Carried to her home in Brooklyn, she never left the house again—appearing in retrospect to have been claimed by neurosis—and continuing to be cared for by her guardian, her late mother's sister, Susan E. Crosby. Thus, she avoided responsibilities as well as becoming the subject of much attention and interest—by doctors, clergy, and the public. And she invented various ways to keep her life exciting (Stacey 2003, 5–70, 284–288).

Studying Mollie's background we see that she had many traits associated with what is now called a "fantasy-prone personality." Such persons are sane and normal but may possess several of some thirteen associated characteristics, including (like Mollie) having a rich fantasy life, supposedly possessing psychic powers, experiencing vivid dreams and apparitional encounters, receiving messages from higher entities, having alternate identities, being highly suggestible, and so on (Wilson and Barber 1983; Baker and Nickell 1992).

Mollie appears to have had an extraordinary impulse to fantasize, and fantasizing does not preclude deception; indeed the two are frequent companions. For instance, consider the case of Joseph Smith, the Mormon prophet, who is included in a list of historical fantasizers (Wilson and Barber 1983, 372) but who was also a notorious charlatan (Nickell 2013, 277–283).

Deception

There are strong indications that Mollie did, in fact, deceive. Using my background as a magician and mentalist, I have read accounts of Mollie's feats with interest and conclude that some of her tricks were so simplistic they could have fooled only the gullible.

Consider Mollie's claim that she never slept, her "trances" being the only rest she obtained. How convenient that those could be as brief as a catnap or as long as twenty-four hours (Dailey 1894, 192).

Then there was her "blindness," sight being one of the senses, along with speech and hearing, she supposedly lost for a time—although we may well suspect she was malingering. So far as we can tell, she simply *acted as if* she could not see and did it convincingly enough to allay the suspicions of her mostly credulous visitors.

On this apparent pretense she built her claim for clairvoyant vision. To convince others she really could not see, she closed her eyes tightly. However, it was usually "quite dark where she lay," which probably did more to keep people from seeing that her eyes only appeared fully closed than it did to retard her sight. (When someone came close, she might well have shut them firmly.) Thus she would describe the person's appearance or draw her thumb over a page of text and say the words as she allegedly "saw" them with "second sight" (Dailey 1894, 31, 126, 187, 208).

Often one had to take her word for some accomplished feat. For instance, someone entering her room and finding her apparently idle might ask her to explain. "Oh, I am reading such and such a book," she would say.

"Well, where is it?"

"Under the bedclothes, here," whereupon she would produce it and speak knowledgeably of its contents (Dailey 1894, 194). Of course, previously, she had likely read the pages in the normal way.

Her stunts are not generally described well enough to deduce exactly how she did them, but she was obviously in control of certain situations and took advantage of opportunities. When, for instance, Mollie divined the contents of a supposedly just-received letter to her—while it was held still sealed, eight feet away—one could suspect the help of her aunt, Miss Crosby, *who had fetched the letter* (Dailey 1894, 211). Mollie could have secretly opened and studied the letter earlier, with Crosby then merely pretending it had just come. There is little doubt she coddled her niece, and aiding Mollie in her deceptions could have been part of that.

As to Mollie's astonishing claim of *inedia*—the alleged ability to forgo nourishment (Nickell 1993)—that was palpably false. Photographs (again, see Figure 1) show her plumpness, which gave the lie to her claims. Miss Crosby should have been aware of food missing from the household larder, and I suspect she willingly bought whatever her spoiled charge favored.

There is further corroborative evidence at hand. Mollie's nemesis, Dr. Hammond—anticipating James Randi by a century—challenged her to tests. Regarding her "second sight," he proposed to have her divine the number, date, bank account, and signature of a check that would be sealed in an envelope and kept in sight. And he intended to prevent her eating by having his fellow neurologists conduct a round-the-clock watch for one month. Revealingly, though not surprisingly, Mollie refused (Stacey 2003, 120–121).

Denouement

Hammond was derided by Mollie's friends and fans. One letter read: "I style it abuse and insult for any human being to propose to invade the privacy of the afflicted lady's sick room for one month, to watch her every movement day and night and give her one thousand dollars if, at the end of that time, she is not proven to be an impostor. . . . To be an impostor one must have some motive, and Miss Fancher certainly can have none," the letter writer said naively. When one reporter queried Hammond as to how Mollie could have deceived the very learned clergymen who came to support her, Hammond bluntly responded: "Oh, that's nothing. Clergymen are the most gullible men in the world!" (Qtd. in Stacey 2003, 123.)

Hammond had written admirably in his earlier critical book, *The Physics and Physiology of Spiritualism* (1871): "Man has learned to doubt, and therefore, to reason better; he makes experiments, collects facts, does not begin to theorize until his data are sufficient, and then is careful that his theories do not extend beyond the foundation of certainty, or at least of probability, upon which he builds." He went on to write in his book *Fasting Girls: Their Physiology and Pathology* (1879):

> If Miss Fancher has lived fourteen years without food, or even fourteen months, or weeks, she is a unique psychological or pathological individual, whose case is worthy of all the consideration which can be given to it, not by superstitious or credulous or ignorant persons, but by those who, trained in the proper methods of scientific research, would know how to get the whole truth of her case, and nothing but the truth.

Mollie Fancher continued her deceptions. She made an arrangement for Abram H. Daily of Brooklyn, an ex-judge and spiritualist who defended exposed mediums (Kontou with Willburn 2012, 264), to write a book with the elaborate title, *Mollie Fancher, the Brooklyn Enigma. An Authentic Statement of Facts in the Life of Mary J. Fancher, the Psychological Marvel of the Nineteenth Century. Unimpeachable Testimony of Many Witnesses* (Dailey 1894). Except for publishing costs, the rights and proceeds went to Miss Fancher who sold copies along with a book company. A copy in our CFI libraries, which Director Tim Binga entrusted to me, bears her autograph on the title page.

There is further corroborative evidence at hand. Mollie's nemesis, Dr. Hammond—anticipating James Randi by a century—challenged her to tests.

By the time of Dailey's book (1894, 215), Aunt Susan was deceased. But the Fancher house parlor continued as "a shop for the sale of souvenirs to pilgrims." It had done a "thriving business" in wax flowers that Mollie crafted, along with her needlework, according to the *Chicago Tribune* (Collins 1938). Miss Crosby, the paper said, "was suspected of nothing more than participation as an accomplice in Mollie's mind-reading acts." Following the aunt's death (the paper continued):

> Mollie's physical condition was notably improved. Her five personalities had assembled into one; her blindness was no longer total; she could use both arms and move her waist; she had found an appetite and gained in weight and strength. With these physical improvements her psychic powers had waned.

Another way of looking at the transformation is that Miss Crosby's absence meant Mollie no longer had an accomplice for her pretenses or someone to indulge her perpetual adolescence. She herself died on February 11, 1916, and was buried in Brooklyn's Green-Wood Cemetery on February 15—that date sometimes being incorrectly given as her death date. ■

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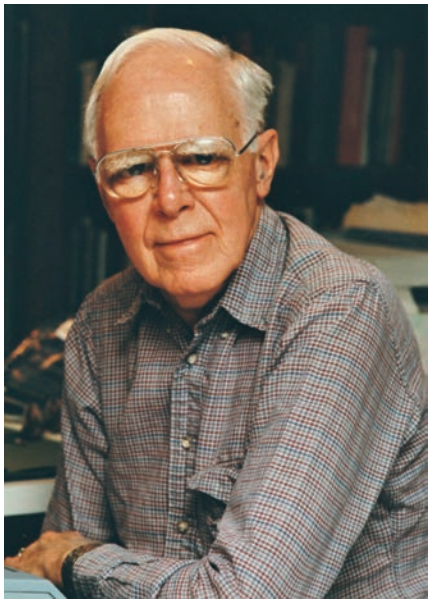
[A MAGICIAN IN THE LAB JAMES RANDI

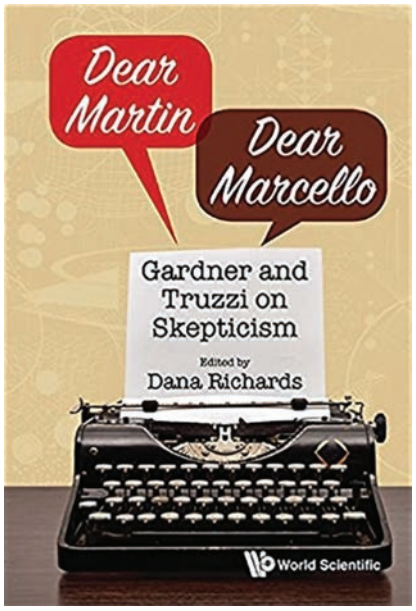
James Randi began his career as a stage magician and escape artist but achieved fame as a professional skeptic, disproving the claims of self-described psychics, mind readers, and faith healers. He is a founder of the Committee for Skeptical Inquiry (formerly CSICOP). Randi's eleventh book, *A Magician in the Laboratory*, will be coming out soon.

A Great And Fortuitous 'Find'!

I have recently been sent—courtesy of Skeptical Inquirer Editor Ken Frazier—a most remarkable book, edited by Dana Richards of George Mason University and copyrighted this year by World Scientific Publishing Co. This is 458 pages of closely packed texts of correspondence exchanged between the late Martin Gardner and the late Marcello Truzzi between May 1970 and April 1999. It is titled *Dear Martin / Dear Marcello* (see New and Notable section of this magazine, September/October 2017, p. 60).

Most of my readers will know who Martin Gardner was, though fewer will recognize the Truzzi name. Marcello Truzzi (1935–2003) was the son of a very famous juggler, a man who became a major performer with the famous Barnum & Bailey Circus. Marcello Truzzi became an American citizen, majored in sociology at the University of Florida, and got his master's degree there and a doctorate at Cornell. As a professor of sociology at Eastern Michigan University, he became very interested in what was known as an "occult revival," which dealt with astrology, witchcraft, Satanism, and parapsychology, along with such accompanying nonsense as prophecy, monsters, and UFOs. In





1973, he started a newsletter titled *Explorations* that dealt with occult and pseudoscientific subjects, later a small journal titled *The Zetetic Scholar* (the word *zetetic* means "skeptical"). When the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP) was founded in 1976, Truzzi was for a time cochair with philosopher Paul Kurtz (and he was also editor of *The Zetetic*, the name under which this magazine was first published). But CSICOP soon parted ways with Truzzi because he insisted on presenting both sides of "paranormal" subjects, with equal attention given to any sort of ridiculous magical claim right alongside logical, rational, scientific considerations of these claims.

I note that there are occasional spelling errors in this book, which may well be due to Gardner's very rapid typing style, and his individual input to this book *far* exceeds that of the others. I was surprised, for example, to see that an astronomer named Clyder Tom-

baugh had contributed (it should be "Clyde"). The index to the book is eight pages of only where the names *first* appear (and "Clyder" persists) though as expected, persons such as Shipi Strang and Uri Geller are very generously represented, alongside gems from Gardner directed at Truzzi such as:

> Do I recall correctly that you'd like for me to review the Wilhelm book for the *Zetetic*? If so, let me know the approximate length you want it. It is far and away the most revealing book yet on the incompetence of P and T . . .[1]

Gardner, again:

> Did you know that "Doc" Tarbell[2] wrote a hardcover book on physiognomy, and that the "Dr" was based on a degree in napropathy, a weird offshoot of chiropractic?
>
> On page 3 you list Beloff[3] as being "well-informed about the methodology of magic." Incredible! Beloff knows nothing about magic, and freely admits it. Take him off this list! I know of no parapsychologist more ignorant of magic.

Gardner was often seriously annoyed by Truzzi and made that very evident to him:

> Along with your usual bashing of Randi, I would have liked to see some more bashing of Rhine for his failure to allow magicians to observe tests and his refusal to publish reports of tests there were failures and his valiant efforts to avoid admitting cases of outright fraud . . .

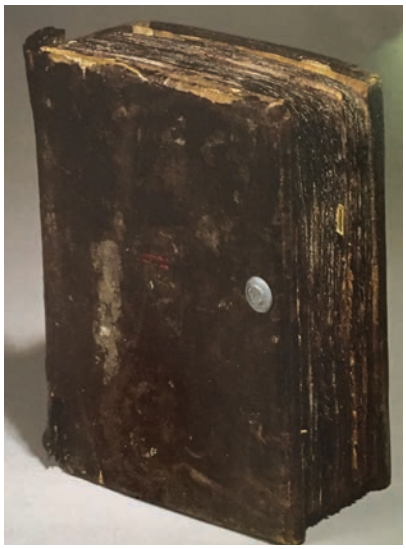
Forgive my use of a reference to myself, but I am fiercely proud of the relationship I had with Gardner, whose objection to Rhine's habit of naming "successful" subjects who performed before him—but never naming those whom he caught cheating—was such a purposeful omission. Gardner, again:

> Geller, on (a popular daytime TV show) two weeks ago, came out in support of Puharich. He said, "Every word in the book is true," and that the *Popular Photography* piece this month is the "dying gasp" of his enemies.

Andrija Puharich (1918–1995) was a devotee of anything labeled "paranormal," to the extent that he produced a book titled, *Uri, A Journal of the Mystery of Uri Geller*. To quote from the introduction to this book by Doubleday, a publisher more often occupied by producing factual literature:

> Out of the friendship between Dr. Puharich and Uri Geller grew one of the most extraordinary adventures of a lifetime. Not long after their first meeting . . . they were contacted by "Spectra," a voice they believed to represent an extraterrestrial intelligence called "Hoova." This is Dr. Puharich's account of how he and Uri thus became the first individuals in modern history believed to have made extended contact with non-earthly beings; how "Hoova" explained the source of Uri's psychic powers; and what they learned about the relationship between this intelligence and the inhabitants of earth.[4]

I cannot simply recommend the book unless the readers are really prepared to work at extracting the wisdom to be found there.



The Archimedes Palimpsest

And yes, we also might wonder whether Hoova might be the source of vacuum cleanahs, but that can wait for another time . . .

I hope that my readers are beginning to appreciate just how damn silly the Geller claims are, how he made use of such facilities as those at the ordinarily serious Stanford Research Institute, and of people such as Puharich, who died (aged seventy-seven) in abject poverty at the home of a generous benefactor after falling down a flight of stairs. Of course, these agencies and individuals were sufficiently funded—often handsomely—by our tax money, coasting along on our backs, as they say, "all the way to the bank."

I cannot simply recommend the book unless the readers are really prepared to work at extracting the wisdom to be found there, and that would require some considerable dedication. However, I'll close this effort with a sincere and warm endorsement of another tome that reveals the depth of an ancient mind of Greece: that possessed by Archimedes of Syracuse (c. 287–c. 212 BCE). I strongly recommend *The Archimedes Codex* published by Da Capo Press in 2007 and now available is several languages. This remarkable man, Archimedes, it can be argued, was probably the greatest genius ever to live, his range of interests being so wide and so hugely productive. I'll refer my readers to Wikipedia, where so much is related about him, and next time you read this column, I'll expect you to be better informed on this subject!

In 1998, I first saw—and handled with my own hands!—the palimpsest that after hundreds of years finally surrendered its secrets due to dedicated research done at the Walters Museum in Baltimore. In fact, it was purchased, for two million dollars, by a personal—and anonymous—friend of mine, and then began its adventures. . . . But look it up. Please.

There will be a quiz . . .

Notes

1. Puthoff and Targ, the pair of fumblers who essentially created the Uri Geller mythology
2. "Doc" Tarbell was author of a series of instruction books for young would-be conjurers.
3. John Beloff (1920–2006), a well-known UK parapsychologist
4. No, not of burrowing animals! "Earth" is the name of our home planet!

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The Conspiracy of the Fairies

This year, 2017, marks the hundredth anniversary of one of the most famous hoaxes in history: the Cottingley fairies photos, taken by two Yorkshire girls in 1917. Or were they? A new hypothesis, recently put forward in the pages of *Fortean Times* magazine, suggests that the photos may actually have been taken later, after very similar pictures, recently rediscovered, had already been created by other photographers. But why would the dates of the Cottingley photos be changed? That's the interesting part. Let's first take a step back and review the story.

The 'Revelation' of the Fairies

"I have something . . . precious" Sir Arthur Conan Doyle, creator of Sherlock Holmes, wrote one day in 1920 to his (then) friend Harry Houdini. "Two photos, one of a goblin, the other of four fairies in a Yorkshire wood. A fake! you will say. No, sir, I think not. However, all inquiry will be made. These I am not allowed to send. The fairies are about eight inches high. In one there is a single goblin dancing. In the other four beautiful, luminous creatures. Yes, it is a revelation" (Doyle 1921).

The pictures he was referring to were taken by Elsie Wright and Frances Griffith, two girls living in Yorkshire who enjoyed playing outdoors. One day in July 1917, so the story goes, they asked Elsie's father, Arthur, if they could borrow his new Midg camera and with that they took some pictures of themselves with what appeared to be little fairies and goblins. When the pictures found their way into Doyle's hands, first he had them examined by experts and, although Kodak representatives told him they could undoubtedly reproduce similar effects, he preferred to believe a photographer who asserted that he would have been able easily to spot any trick. Since he could not detect any photographic fakery (such as double exposures) in the fairy images, he declared them genuine and Doyle believed him.

Poor Sherlock Holmes!

Doyle's good friend and Spiritualist Sir Oliver Lodge, however, refused to accept the photos as genuine. It seemed to him that some Californian classical dancers had been superimposed against a rural British background. Doyle replied dismissively that such tricks would have been quite impossible for two "working-class Yorkshire girls."

He could not bear to entertain the possibility of fraud on the part of two young girls: the very idea offended his notions of chivalry. He considered the photos an "epoch-making event"—and declared so to the world, first with articles in the *Strand* magazine and then with a book, *The Coming of the Fairies* (1922), which contained all five pho-

Left: Frances with fairies before her at a glen in Cottingley: Was it taken in 1917? (Massimo Polidoro Collection). Middle: A rarely seen photo of Elsie and Frances at the Cottingley glen, probably taken by Arthur Wright around 1920 (Massimo Polidoro Collection). Right: A photo from early 1918 by the mysterious Dorothy Inman (Brotheron Collection, Leeds University Library).

tographs taken by the girls. He saw himself as a pioneer: "The discovery of Columbus of a new terrestrial continent," he wrote in the book, "is a lesser achievement than the demonstration of a completely new order of life inhabiting the same planet as ourselves" (Doyle 1921).

The reaction of the public and of the press was of amusement, if not downright scorn: "Poor Sherlock Holmes," ran one headline, "Hopelessly Crazy?" and phrases like "easily duped" and "sad spectacle" began to appear in the papers.

It would take more than sixty years for the hoax to be revealed. Only in 1982, in fact, when all of the other people involved in the fairies saga had died, eighty-one-year old Elsie and seventy-five-year old Frances felt ready to reveal the truth behind a "practical joke" that had confounded so many people. The fairies were cut-out drawings: "From where I was," Frances said, "I could see the hatpins holding up the figures. I've always marveled that anybody ever took it seriously" (Wright 1983).

Elsie explained that they had agreed to keep silent because they were "feeling sad" for Doyle: "He had lost his son recently in the war, and I think the poor man was trying to comfort himself in these things, so I said to Frances, we are a lot younger than Conan Doyle . . . so we will wait till they die of old age and then we will tell."

Earlier Fairies Photos?

The story is richer with facts and twists, and detailed analysis can be found in books such as James Randi's *Flim-Flam!* (Prometheus Books, 1982) or Joe Cooper's *The Case of the Cottingley Fairies* (Roberta Hale, 1990).

Doyle could not bear to entertain the possibility of fraud on the part of two young girls: the very idea offended his notions of chivalry.

However, Fiona Maher, in a recent article published by *Fortean Times*, wonders if there was more to the episode than what has been repeated for years. She found two very interesting pictures. "The first looks like a direct copy of the most famous of the Cottingley photographs—the initial one showing the fairies dancing before Frances" writes Maher (2017). "Its execution, though, is poor in comparison to the Cottingley pictures, and the pale fairies seem out of place against the dark background."

Nothing much is known about the photographer, except for the fact that the photo was created in 1918 and is held in the same collection as the Cottingley fairies material at Leeds University Library labeled "Mrs. Inman's Fake Photograph."

The second image was taken in the summer of 1917 and published in February 1918 in a popular magazine called *The Sphere*.

"Both images," explains Maher, "pre-date the Cottingley photographs, which weren't seen by anyone outside of the immediate families until 1919. We have only the word of the Wright and Griffith families that the girls took the first Cottingley photographs in the summer of 1917. What if they didn't?" To Maher, the insistence that the first two pictures were taken in 1917 could point to a different conclusion: the adults were part of the conspiracy.

A Forced Deception

The suggestion is that Arthur Wright came across one or both of these earlier pictures and decided he could do better. The photos were taken by an "experienced photographer," according to Kodak's original assessment: Could Arthur have taken them?

If that's the case, Doyle's involvement in the matter made it impossible for Mr. Wright to admit it was a prank. "If he was so embroiled" reasons Maher, "it is likely he was either embarrassed or ashamed of using the girls to front the photos and possibly fearful of being accused of fraud or even of obtaining money by deception."

The fees to publish the photos were in fact paid by those wishing to reproduce them and sell them as postcards, as well as by *The Strand* magazine, who paid ten pounds for their temporary use—a sum that could pay many months' rent on a cottage in those days. Later on, Doyle was able to get a dowry of £100 for the girls. Not bad for a prank.

Maher admits that her own are mere conjectures, but the argument is compelling. No one can prove today who took the photos or when, but it appears certain that even a century later the little fairies of Cottingley may still have some tricks up their wings. ■

The Sphere photo published in Februrary 1918 (Mary Evans Picture Library)

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Moving Science's Statistical Goalposts

In 1989, Ralph Rosnow and Robert Rosenthal, two well-respected experts on statistical methods in psychology, wrote the following memorable line: "We want to underscore that, surely, God loves the .06 nearly as much as the .05" (Rosnow and Rosenthal 1989, 1277).

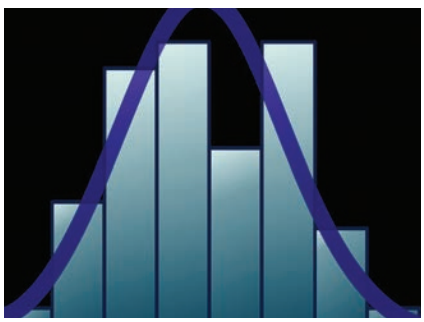
For researchers in psychology—as well as in the biological and social sciences—this was an amusing statement because .05 is the Holy Grail of statistical significance. It may seem unusual to use religious language when writing about scientific methods, but the metaphor is fitting because, for almost as long as scientists have used statistical methods, achieving a probability of .05 or less (e.g., .04, .027, .004) meant publication, academic success, and another step toward the financial security of tenure. But .06 or even .055 meant nothing. No publication and no progress toward a comfortable retirement.

Rosnow and Rosenthal were arguing that scientists had been overly concerned with a single, arbitrary cut-off score, $p < .05$, but today their plea sounds a bit antique. In the latest response to the "reproducibility crisis" in psychology (see my June 2015 online column, "Has Science a Problem?") a group of seventy-two accomplished statisticians, biologists, and social scientists have signed a statement proposing that the criterion be changed from .05 to .005. This may seem like a nerdy technical issue, but the proposed change has profound implications for the progress of science and has ignited a vigorous controversy in the field. But I'm getting ahead of myself. Let's step back and figure out what this is all about.

The Reverse Logic of Statistical Significance

The idea came from the British biologist and statistician Ronald Fisher, a man Richard Dawkins has called "the greatest biologist since Darwin" (The Edge 2011). Fisher invented many statistical techniques—including the analysis of variance (ANOVA)—and, ever since, learning how to use Fisher's methods has been the bane of graduate students in biology, psychology, and many other disciplines.

Fisher recognized that you cannot affirm the consequent. Scientists are commonly in the position of wanting to prove that a variable they are interested in causes something to happen. For example, imagine a chemist has identified Compound X, which she believes will promote hair growth in balding humans. She creates a Compound X lotion and a placebo lotion and conducts an experiment on balding volunteers. Lo and behold, the people in her Compound X group grow more hair than those in the placebo group. If her experiment was otherwise well designed and conducted, can she safely conclude Compound X grows hair? Of course not. It might just have been a lucky test, and furthermore no number of positive tests can prove the rule.

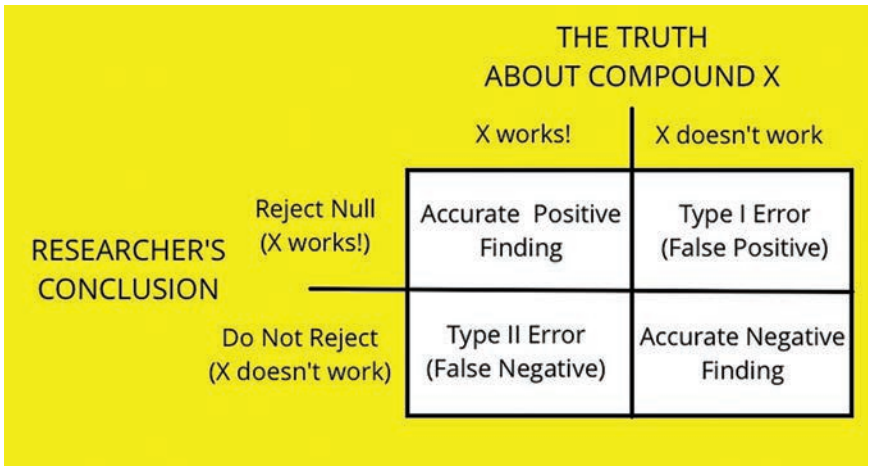


A histogram of iris sepal widths showing a roughly bell-shaped distribution. Based on a dataset maintained by Ronald Fisher. (source: Wikimedia)

Understanding this, Fisher proposed to turn the question around, creating a straw person that could be knocked over with statistics. What if we assume the opposite, that Compound X has no effect at all? This idea is what Fisher called the "null hypothesis": the hypothesis of nothing going on, no effect. Then, he reasoned, we can determine the probability of our experimental findings happening merely by chance. This is where ANOVA and other statistical methods come in. Fisher suggested that statistical tests could be used to estimate the kinds of outcomes that would be expected due to random variations in the data. If the result obtained in an experiment was very unlikely to occur by chance, then the researcher would be justified in rejecting the null hypothesis of no effect. It would be fairly safe to say something real was going on. For example, if our chemist's statistical analysis found the probability of getting the amount of hair growth she saw in the Compound X group to be .04—meaning that by chance alone we

could expect the same result in only 4 of 100 similarly run experiments—then it would be reasonable for her to conclude Compound X really worked.

So was born the Null Hypothesis Significance Test (NHST), and before long it was the law of the land. Fisher proposed a probability (p-value) of .05, and it came to pass that researchers in a variety of fields could not expect to get their articles published unless they performed the appropriate statistical tests and found that p was < .05 (a probability of the null hypothesis being true in less than 5 percent of cases). Point zero five became the accepted knife edge of success: p < .055 meant your results were junk, and p < .048 meant you could pop the champagne. P < .05 was not a magical number; it just became the accepted convention—a convention that Rosnow and Rosenthal, as well as others (e.g., Cohen 1990) have criticized to no avail. It remains a fossilized criterion for separating the wheat from the chaff. But perhaps, not for long.



The four possible outcomes of a null hypothesis significance test of Compound X's ability to grow hair.

Strengthening Scientific Evidence

Statistics is one of those fields that has been plagued by a number of dustups over the years, but this latest controversy over p-values is inspired by the reproducibility crisis, the discovery that many classic experiments—primarily in social and cognitive psychology—could not be reproduced when attempted again. The resulting loss of confidence in research findings has spawned a number of reforms, most notably the Open Science movement, about which I wrote in my December 2016 online column, "The Parable of the Power Pose and How to Reverse It" (Vyse 2016). The open science approach makes research a much more public and collaborative enterprise and makes the common practice of "p-hacking"—fiddling with your data until something significant pops out—much more difficult (see my previous SI column, "P-Hacker Confessions: Daryl Bem and Me," September/October 2017).

Then, in July of 2017, seventy-two scientists (Benjamin et al. 2017) wrote the proposal to simply make the criterion for significance more difficult by moving the cut-off from 5 out of 100 to 5 out of 1,000 (p < .005). This would greatly help one of the issues the authors presume to be a cause of the reproducibility problem: Type I error. When we say something is statistically significant, we are simply saying that it is unlikely the observed effect is due to chance. But it's not impossible. By definition, the choice of the .05 significance level means that we are willing to live with a 5 percent chance of an error—saying there is an effect when actually our results were caused by normal random variation. This is a kind of false positive result. For example, if Compound X is useless, our choice of the .05 criterion means that in five tests out of a hundred we would conclude something was happening when nothing was. And when, as is most often the case, we conduct just a single test, how do we know whether ours is one of the five random cases that just happened to make Compound X look like it works? Based on a single test, we really can't say.

Moving the statistical criterion to .005 would make the chances of a Type I error much lower, which means that the findings that reach publication would be more trustworthy and more likely reproducible. This is a worthy goal, and there is no easier fix than simply requiring a stronger test. But such a change would not be without costs. When you reduce the chances of a Type I error, you increase the chances of a different kind of error with the clever name of Type II. Type II errors are caused when the effect you are studying is real, but your test fails to show it. Compound X really can grow hair, but by chance, your test came up nonsignificant: p > .05: a kind of false negative result. The change to .005 proposed by the gang of seventy-two would make false negatives more common, and given the often enormous time and cost involved in modern research, it would mean that important results that would contribute to our knowledge base would be likely to die on the vine. Ultimately the progress of science would be slowed.

Perhaps anticipating this objection, the seventy-two authors proposed that results falling between the traditional .05 and the new .005 might still be published as "suggestive" rather than statistically significant. Furthermore, the p < .005 criteria would only be applied to tests of new phenomena, and replications of previously published studies could remain at .05. But it is clear the change would still have a powerful effect. As someone on one of my Internet discussion groups suggested, this change might make many psychology journals much thinner than they are now. I haven't checked, but I am fairly certain several of my own published studies would have to be demoted to the "suggestive" category.

The Response

The proposal by the seventy-two researchers is scheduled to appear in a future issue of the journal *Nature Human Behavior*, but the prepublication copy posted online has already attracted much publicity and considerable comment from the scientific community. Many researchers have welcomed the .005 suggestion, which has been offered

by others in the past (Resnick 2017), but there has also been some pushback. Psychologist Daniel Lakens is organizing a group rebuttal. According to an article on Vox, one of Laken's primary objections is that such a technique will slow the progress of science. It may strengthen the published research literature at the cost of discouraging graduate students and other investigators who have limited resources.

Typically, the most effective way to increase the power of a statistical test and the likelihood of reaching a stringent significance level, such as $p < .005$, is to increase the number of participants in your study. Although the Internet provides new opportunities for collecting large amounts of survey data, consider the difficulties of developmental psychologists who study infant behavior in the laboratory. As important as this work is, it might end up being limited to a few well-funded centers. Psychologist Timothy Bates, writing in *Medium*, makes the more general argument that a cost-benefit analysis of the switch to .005 comes up short. Research will become much more expensive without, in his view, yielding equal benefit (Bates 2017).

Finally, there is the question of placing too much emphasis on one issue. John Ioannidis is a Stanford University statistician and health researcher whose paper "Why Most Published Research Findings Are False" (Ioannidis 2005) is a classic document of the reproducibility movement. He is also one of the seventy-two signers of the .005 proposal. But Ioannidis admits that statistical significance is not the only way to judge a study: "statistical significance [alone] doesn't convey much about the meaning, the importance, the clinical value, utility [of research]" (quoted in Resnick 2017). Even if Compound X produced a significant increase in hair growth ($p < .005$), the hair growth in question might not be noticeable enough to make the treatment worth using. Under the proposed more stringent statistical criteria, researchers might concentrate on getting results that are likely to get them over the statistical goal line and pass up more meaningful topics.

Will It Happen?

So how likely is it that the goalposts will get moved and journals will begin to require a $p < .005$ level of significance? I suspect the probability is low. Not five chances out of a thousand, but less than 50/50. There are good reasons for making this correction, particularly at this time when confidence in social science research is at a low point. But, for a couple of reasons, I don't think it will happen.

First, because this controversy is relatively new, the objectors are still developing their responses. As the conversation gets going, I suspect we will hear more concerns about Type II errors—real phenomena that will be missed because they fail to meet the $p < .005$ criterion—and about discouraging young investigators from going into research. No one is in favor of that.

But I suspect one of the biggest sources of resistance will be based in economics rather than in arcane technical and professional issues. It turns out that academic publishing is enormously profitable—a $19 billion business worldwide that, according to *The Guardian*, is far more profitable than either the film or music industries (Buranyi 2017). A large portion of this success comes from a unique business model in which the product being sold—academic scholarship—is obtained essentially for free. Research that often costs millions of dollars in research grants and salaries to produce is handed to publishers such as Elsevier or Springer for nothing. Even peer reviews of submitted manuscripts are done by researchers who donate their time for free.

Academic publishing is a kind of crazy, incestuous feedback loop. Researchers must get their work published in high-quality journals if they wish to advance their careers, and scholars and university libraries must pay exorbitant subscription costs to gain access to the same journals. The current system is being threatened by Sci-Hub, a pirated archive of scientific publications, and by a growing number of scholars who are posting prepublication versions of their work online (Rathi 2017). Eventually, all scientific publishing may be entirely free and open, but until that day, the publishing industry will continue to be hungry for material. As a result, the prospect of much less content and thinner journals will not be a welcome thought, and I suspect this attitude will be communicated down the line to editors who must choose whether to adopt the new standard or not. The publishing gods love .05 much more than .005. ■

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Editing the Human Germline: Groundbreaking Science and Mind-Numbing Sentiment

Should biologists use new gene-editing technology to modify or "correct" the human germline? Will our methods soon prove sufficiently safe and efficient and, if so, for what purposes? Much-celebrated CRISPR gene-editing pioneer Jennifer Doudna recently recalled her initial trepidations over that very prospect:

> Humans had never before had a tool like CRISPR, and it had the potential to turn not only living people's genomes but also all future genomes into a collective palimpsest upon which any bit of genetic code could be erased and overwritten depending on the whims of the generation doing the writing. . . . Somebody was inevitably going to use CRISPR in a human embryo . . . and it might well change the course of our species' history in the long run, in ways that were impossible to foretell. (Doudna and Sternberg 2017)

And it didn't take long. Just one month after Doudna and others called for a moratorium on human germline editing in the clinical setting, scientists in Junjiu Huang's lab at Sun Yat-sen University in Guangzhou, China, published a paper describing their exclusively *in vitro* use of CRISPR on eighty-six human embryos (Liang et al. 2015). Huang's goal was to edit mutated beta-globin genes that would otherwise trigger a debilitating blood disorder called beta-thalassemia.

But the outcomes were mixed, at best. After injecting each embryo with a CRISPR complex composed of a guide RNA molecule, a gene-slicing Cas-9 enzyme, a synthetic repair DNA template, and a "glow-in-the-dark" jellyfish gene that allows investigators to track their results as cells continue to divide, Huang's team delivered a paltry 5 percent efficiency rate. Some embryos displayed unintended "off-target" editing.

Within a single day of Mitalipov's report, eleven scientific and medical organizations published a position statement outlining their recommendations regarding the human germline.

In others, cells ignored the repair template and used the related delta-globin gene as a model instead. A third group of embryos turned mosaic, containing cells with an untidy jumble of editions. Part of the problem was that CRISPR had initiated only after the fertilized egg had begun to divide.

By using nonviable triploid embryos containing three sets of chromosomes instead of the usual two, Huang avoided objections that he had destroyed potential human lives. Nevertheless, both *Science* and *Nature* rejected his manuscript based in part on ethical concerns. Several scientific agencies also promptly reemphasized their stances against human germline modification in viable embryos, and, in the United States, the Obama administration announced its position that the human germline should not be altered at that time for clinical purposes. Francis Collins, director of the National Institutes of Health, emphasized that the U.S. government would not fund any experiments involving the editing of human embryos. And finally, earlier this year, a committee of the U.S. National Academies of Sciences and Medicine decreed that clinical use of germline editing would be allowed only when prospective parents had no other opportunities to birth healthy children.

Meanwhile, experimentation continued in China, with similarly grim results. But this past August, an international team based in the United States—this time led by embryologist Shoukhrat Mitalipov at the Oregon Health and Science University in Port-

land—demonstrated that, under certain circumstances, genetic defects in human embryos can, in fact, be efficiently and safely repaired (Ma et al. 2017).

Mitalipov's group attempted to correct an autosomal dominant mutation—where a single copy of a mutated gene results in disease symptoms—of the *MYBPC3* gene. Crucially, such mutations are responsible for an estimated 40 percent of all genetic defects causing hypertrophic cardiomyopathy (HCM), along with many other inherited cardiomyopathies. Afflicting one in every 500 adults, HCM cannot be cured and remains the most common cause of heart failure and sudden death among otherwise healthy young athletes. These mutations have escaped the pressures of natural selection, unfortunately, due to the disorder's typically late onset—following reproductive maturity.

The author then laments the fact that, due to modern reproductive technology, fewer children are being born with Down's syndrome.

Prospective parents can, however, prevent HCM in their children during the *in vitro* fertilization/preimplantation genetic diagnosis (IVF/PGD) process. Where only one parent carries a heterozygous mutation, 50 percent of the resulting embryos can be diagnosed as healthy contenders for implantation. The remaining unhealthy 50 percent will be discarded. As such, correction of mutated *MYBPC3* alleles would not only rescue the latter group of embryos but improve pregnancy rates and save prospective mothers—especially older women with high aneuploidy rates and fewer viable eggs—from risks associated with increasing numbers of IVF/PGD cycles as well.

With these critical facts in mind, Mitalipov and colleagues employed a CRISPR complex generally similar to that used by Huang. It included a guide RNA sequence, a Cas-9 endonuclease, and a synthetic repair template. In one phase of their investigation, the team fertilized fifty-four human oocytes (from twelve healthy donors) with unhealthy sperm carrying the *MYBPC3* mutation (from a single donor) and injected the resulting embryos eighteen hours later with the CRISPR complex. The result? Thirteen treated embryos became jumbled mosaics.

Mitalipov changed things up considerably, however, in the study's second phase by delivering the complex much earlier than he and others had done in previous experiments—indeed, at the very brink of fertilization. More precisely, his colleagues injected the CRISPR components along with the mutated sperm cells into fifty-eight healthy, "wild-type" oocytes during metaphase of the second meiotic division. Here, the results were impressive, to say the least. Forty-two treated embryos were normalized, carrying two copies of the healthy *MYBPC3* allele—a 72 percent rate of efficiency; no "off-target effects" were detected, and only one embryo turned mosaic.

Mitalipov's team achieved a genuine breakthrough in terms of both efficacy and safety. Perhaps nearly as interesting—and, in fact, the study's primary finding, according to the authors—is that, in both experimental phases, the embryos consistently ignored Mitalipov's synthetic repair template and turned instead to the healthy maternal allele as their model. Such is not the case when CRISPR is used to edit somatic (body) cells, for example. Apparently, the team surmised, human embryos evolved an alternative, germline-specific DNA repair mechanism, perhaps to afford the germline special protection.

The clinical implications of this repair preference are profound and, at least arguably, very unfortunate. First, with present methods, it now appears unlikely that scientists could engineer so-called "designer babies" endowed with trait enhancements. Second, it seems nearly as doubtful that CRISPR can be used to repair homozygous disease mutations where both alleles are mutant. Nevertheless, Mitalipov's method could be applied to more than 10,000 diseases, including breast and ovarian cancers linked to *BRCA* gene mutations, Huntington's, cystic fibrosis, Tay-Sachs, and even some cases of early-onset Alzheimer's.

At least in theory. As of this writing, Mitalipov's results have yet to be replicated, and even he warns that, despite the new safety assurances and the remarkable targeting efficiencies furnished by his most recent work, gene-editing techniques must be "further optimized before clinical application of germline correction can be considered" (Ma et al. 2017). According to stem-cell biologist George Daley of Boston Children's Hospital, Mitalipov's experiments have proven that CRISPR is "likely to be operative," but "still very premature" (Ledford 2017). And while Doudna characterized the results as "one giant leap for (hu)mankind," she also expressed discomfort with the new research's unmistakable inclination toward clinical applications (Belluck 2017).

Indeed, within a single day of Mitalipov's report, eleven scientific and medical organizations, including the American Society of Human Genetics, published a position statement outlining their recommendations regarding the human germline (Ormond et al. 2017). The authors appeared to encourage not only *in vitro* research but public funding as well. Although they advised against any contemporary gene-editing process intended to culminate in human pregnancy, they suggested that clinical applications might proceed in the future subject to a compelling medical rationale, a sufficient evidence base, an ethical justification, and a transparent and public process to solicit input.

And of course researchers such as Mitalipov will be forced to deal with those who claim that, regardless of purpose, the creation and destruction of human embryos is always ethically akin to murder (Mitalipov destroyed his embryos within days of their creation). But others have lately expressed even less forward-thinking and, frankly, even more irrational and dangerous sentiments.

For example, a thoroughly galling article I can describe further only as "pro-disability" (in stark contrast to "pro-disabled") was lately published, surprisingly to me, in one of the world's most prestigious science publications (Hayden 2017). It begins by describing a basketball game in which a nine-year-old girl, legally blind due to genetic albinism, scored not only the winning basket, but, evidently—through sheer determination—all of her team's points. Odd, perhaps, but great! So far.

But the story quickly turns sour, to the girl's father who apparently had asked the child, first, whether she wished she would have been born with normal sight, and, second (excruciatingly), whether she would ever help her own children achieve normal sight through genetic correction. Unsurprisingly, the nine-year-old is said to have echoed what we then learn to be her father's heartfelt but bizarre sentiment: "Changing her disability . . . would have made us and her different in a way we would have regretted," which to him, would be "scary."

To be fair, the article then very briefly appends counsel from a man with Huntington's, for instance, who suggests that "anyone who has to actually face the reality . . . is not going to have a remote compunction about thinking there is any moral issue at all." But the narrative quickly circles back to a linguist, for example, who describes deaf parents who deny their disabilities and have even selected for deafness in their children through IVF/PGD, and a literary scholar who believes that disabilities have brought people closer together to create a more inclusive world (much as some claim Western terrorism has). The author then laments the fact that, due to modern reproductive technology, fewer children are being born with Down's syndrome.

To summarize, according to one disabilities historian, "There are some good things that come from having a genetic illness" (Hayden 2017). Uh-huh. In other words, disabilities are actually beneficial because they provide people with challenges to overcome—as if relatively healthy people are incapable of voluntarily and mindfully designing both mental and physical challenges for themselves and their kids.

I think not. Disabilities, by definition, are bad. And, as even a minimally compassionate people, if we possess any safe and efficient technological means of preventing blindness, deafness, or any other debilitating disease in any child or that child's progeny, we also necessarily have an urgent ethical obligation to use them. ■

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[SKEPTICAL INQUIREE BENJAMIN RADFORD

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Legitimizing Woo

Q: **I was sent a link to your article about the Sandy Hook conspiracies (https://tinyurl.com/y747c2gf), and my question is: Why even give these people the time of day? I unfortunately watched the [pro-conspiracy] YouTube video before realizing what I had done: contributed to helping the creator make money off of YouTube. Why help drive traffic to these people's business ventures?**

—Jason R.

A: You bring up a good question, one that I and other skeptics and media literacy educators struggle with. The answer is that it's a no-win situation: If you ignore the claims (of UFOs, Bigfoot, ghosts, conspiracies, etc.) then believers say to themselves and others: "See? There must be something to it. . . . No one is refuting the claims or answering these questions. The skeptics can't answer our arguments!" People will often assume that if they are not hearing a solid, categorical rebuttal that it's not because scientists and skeptics think it's too silly to bother with but instead that they can't or won't address the claims.

But the reason that psychic powers, Bigfoot, ghosts, and other phenomena are not accepted by the scientific community is simply because there is little or no good evidence for them—not because scientists haven't looked at the evidence. Better research follows better evidence, and as one prominent scientist and Bigfoot researcher, British primatologist John Napier, noted, "There are no shortage of problems to tackle, and it is not surprising that scientists prefer to investigate the probable rather than beat their heads against the wall of the faintly possible." Because scientists (with rare, notable exceptions such as Neil deGrasse Tyson or Bill Nye) generally don't spend their time addressing seemingly supernatural or paranormal claims, that job often falls to skeptics. In fact, it's one of the most important roles of organized skepticism.

Science-fiction author and skeptic L. Sprague de Camp once wrote that Erich von Daniken's books are "solid masses of misstatements, errors, and wild guesses presented as facts, unsupported by anything remotely resembling scientific data." Though desiring to refute von Daniken's *Chariots of the Gods* arguments, de Camp realized that a thorough analysis would "take years of my time; and, if I were mad enough to write it, who would read it?" This conundrum is emblematic of the skeptic's dilemma.

This tension also emerges in the discussion about whether scientists should debate pseudoscientists, for example when Bill Nye debated creationist Ken Ham on February 4, 2014 (Ham briefly referenced me during the debate, much to my amusement). By putting a scientist and a nonscientist on the same stage together, there is a real danger of legitimizing creationism and giving the appearance that "both sides" are equally valid. Anyone is free to hold whatever beliefs or opinions they like, no matter how unscientific or false. But there is no obligation by the news media to portray both sides as having equally strong or valid scientific arguments, when by any measure they do not.

The concern about indirectly promoting the very information skeptics are trying to combat has long been

recognized; one method devised to address the problem was DoNotLink, an online tool used among skeptics. Tim Farley wrote about this on his *Skeptical Software Tools* blog (see https://tinyurl.com/ydynubhw). However, DoNotLink's effectiveness was disputed and by 2016 the service was defunct; other online tools are emerging.

Ideally, the best way to treat these people would be to ignore them, but in practice that's counterproductive. In the case of the Sandy Hook conspiracy, my research allowed people to link to an informed critical analysis. Mine wasn't the only of its type, of course—there were other rebuttals available online on smaller blogs and videos—but mine was among the highest profile. I did my best to address the topic while minimizing any promotion of the claims.

This problem is compounded when journalists misleadingly cite the number of views, hits, or shares on social media as evidence of given content's support. But just because a conspiracy or crank pseudoscience video has five million views, for example, does not necessarily imply that five million people watched the video or agreed with anything in it. It just means that according to online metrics—whose accuracy has been called into question by advertisers and others—a button was (or may have been) clicked five million times. People routinely "like" and share memes and information on social media that they haven't read, or at least not past the headline. Since so little online content is actually read, mere page views cannot be considered genuine endorsement.

The larger question of how to critique content without supporting it is difficult. Any commentary, no matter how harsh or skeptical, may inadvertently help promote it, for the same reason that a scathing review of a film may encourage some people to see the movie, either because they would not have heard about the film otherwise or just to see if the critique is accurate. But the goal of a review or skeptical analysis—whether of a film or a conspiracy theory—is not necessarily to prevent people from seeing the film or viewing information about the conspiracy, but instead to give context and analysis to help people evaluate it. In my career in investigative skepticism, I rarely if ever tell people what to believe. Instead, I offer the results of my analysis (supported by arguments and evidence) to explain the mystery or situation and leave it to the reader to decide.

Ideally, the best way to treat these people would be to ignore them, but in practice that's counterproductive.

In my articles, I provide references (and links when appropriate) to original sources so that readers can more easily evaluate for themselves what information I used and whether I fairly characterized the content. Readers, of course, are under no obligation to buy (or borrow) the books I reference or watch the videos I link to. This also highlights an inherent imbalance in skepticism: in order to fairly and accurately analyze believers' arguments on a given topic, skeptics must necessarily read and engage with their materials. Believers, on the other hand, only rarely even consult skeptical commentary much less take the effort to substantively refute it.

For skeptics who research unseemly topics and must consult books and videos in order to evaluate the material they're critiquing, I have three suggestions: see if your local library can get them; contact friends and local skeptics groups to see if anyone has and will loan you the materials; and peruse used book and secondhand stores (and Amazon.com) to find used materials whose sale will not directly result in royalties for the author. The same problem bedevils social media, of course, in which people "like" and share all sorts of dubious information, inadvertently promoting it. The best thing to do is simply be more diligent about what you share on social media, and when in doubt about the veracity of the information, just ignore it. As always, the best advice is to be skeptical. ■

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PIZZAGATE AND BEYOND

Using Social Research to Understand Conspiracy Legends

JEFFREY S. DEBIES-CARL

It is tempting to dismiss events such as last year's "Pizzagate" shooting as the work of disturbed or unintelligent people, but social research provides an opportunity to explain this and other seemingly absurd episodes and perhaps help avert future tragedies.

IT HAPPENED

less than a year ago. On December 4, 2016, customers were sitting down for a Sunday afternoon meal in the Washington, D.C., pizzeria Comet Ping Pong. Known locally for its quirky atmosphere, live music, and of course its ping pong, on this day the restaurant would make national headlines. Shortly before 3 PM, a man walked in bearing an assault rifle.[1] The man took aim in the direction of one employee, who quickly fled, before discharging his firearm. Law enforcement promptly responded to calls, and officers were able to take the man into custody without further incident. They found two firearms on the suspect and another in his vehicle. Fortunately no one was hurt, but the event has left many people shaken and not only for the obvious reasons. The accused had apparently not intended to commit a mass shooting, nor had he intended to rob the restaurant. The truth, such as it is, turned out to be quite strange nonetheless.

The accused shooter was twenty-eight-year-old Edgar Maddison Welch, a father of two daughters and resident of Salisbury, North Carolina. After his arrest, he told police that he had made the 350-mile drive up to the capital to investigate claims regarding a conspiracy theory, circulating online, that quickly came to be called "Pizzagate" (Metropolitan Police Department 2016). According to this outlandish set of claims, leaked emails from Hillary Clinton's campaign manager, John Podesta, contained coded signs and messages revealing that Comet Ping Pong was actually a front for an occult, child sex slave ring involving the owner of the restaurant, James Alefantis, Podesta, and Clinton herself. For several days before the presidential election, claims of this sort proliferated across the Internet. Alefantis and his employees began receiving menacing messages via social media, including overt death threats (Kang 2016). The events seemed to reach a climax with Welch's misadventure. He subsequently told police that his intention was to investigate these claims in person and, if he found them to be true, rescue the children held captive there.

This story is admittedly bizarre in many ways, and learning more about the shooter's motivations does not seem to shed much light on it. Likewise, while others have documented the origins and spread of the groundless Pizzagate conspiracy theory (e.g., Kang 2016), neither does this mapping necessarily help us understand how something so ludicrous found traction in a surprisingly wide audience, nor why it would motivate anyone to investigate in person. These events—preposterous as they are—can be understood by applying well-established lessons from social research.

First, there is the peculiar nature of the conspiracy theory itself. Unlike many of the stories one might encounter in everyday life, stories of this sort can be understood as legends. According to folklorists, a legend is a type of story about supposed past events told as though it *might* be real: a "legend is a legend once it entertains debate about belief" (Dégh 2001, 97). Unlike a fable or literature, the events described are presented as possible, even if they are bizarre and not necessarily plausible. For example, one legend theme that used to be told frequently involves encounters with an exotic and dangerous animal in a typically safe and familiar

place. People telling the legend usually claim that a friend-of-a-friend, or some other indirect acquaintance, had gone shopping for a carpet at a local department store (Brunvand 1981). He or she put their hand inside a rolled-up rug and felt a sudden, sharp pain. They had been bitten by a snake hiding in the carpet, an exotic species that had apparently been imported, by accident, along with the carpet from some far off, foreign land.

Two characteristics of the story indicate its status as a legend with little or no factual basis. First, no firsthand witnesses can ever be found by researchers. Second, multiple versions of it can be found with varying details. This is because legends constantly change to suit the narrator and the locale in which they are told—the type of shop, the animal, the protagonist—and they can circulate over the years, becoming associated with different people and places (e.g., Radford 2016). Both characteristics apply to the claims about Comet Ping Pong. No witnesses, victims, or perpetrators have come forward, and similar stories have been told about other places at other times. Similar allegations and threats occurred in 2015 in regard to a day care center in Salt Lake City (Peterson 2016), for example. Going further back into history, unfounded panic over alleged occult sexual abuse of children ran rampant during the 1980s and 1990s, and many places and people became the target of groundless accusations (Victor 1993). It appears that the pizzeria was just the latest target of a perennial fear.

Given the ambiguous nature of such stories, people rarely find it easy to determine their credibility. Rather, they must invest a degree of thought and emotional engagement into the narrative while they appraise its merits. One legend, for example, suggests that Martha Washington accidentally invented ice cream when she "left a bowl of cream outside one cold night for a neighborhood kitty and found it frozen solid in the morning" (Ellis 2009, 59). Is this legend true? No, but it sounds like it *could* be, and the central claim is compelling. Consequently, if listeners are engaged with the story, they will frequently seek out further information and participate in intense discussions with others over the legend and its claims. This was certainly the case with the Pizzagate theorizing and, as is the case with conspiracy theories, further information and discourse is likely to be found online and from sources as dubious as the original story. However, the abundance of sympathetic websites and the sheer number of credulous user posts dealing with the topic may appear to be, themselves, evidence that a credible claim has been made. As social psychological research has illustrated, "we determine what is correct by finding out what other people think is correct" (Cialdini 2009, 99).

Given the ambiguous nature of such stories, people rarely find it easy to determine their credibility.

Participation in legends is not necessarily limited to discussion alone. Sometimes the action they provoke manifests in a form called "legend-tripping" (Hall 1973). Inspired by a legend, a person may travel to the alleged site of the story to investigate its validity directly. In doing so, participants enter into the legend itself, acting out a part of it as one of its characters, and thereby "telling" its narrative through the process of ostension—through their behaviors rather than through words (Dégh and Vázsonyi 1983). This usually takes on a fairly innocuous form, such as when adolescents visit a reputedly haunted graveyard and reenact certain behaviors that legend claims will invoke the spirit, such as calling its name at midnight. However, this sort of legend-tripping is precisely what the shooter did as well, albeit much less innocently. Welch saw himself as the potential hero of the story—a rescuer of children. Instead, he put customers at risk, since the only danger present was the danger that he brought with him. As one news headline correctly pointed

out, "Fake News Brought Real Guns" (Kang and Goldman 2016). Similarly, legends are not simply stories about events that supposedly occurred in the past. They also serve as "maps for action" (Ellis 2003, 325). As such, they can tell more about the future than the past. Perhaps it should have been expected that the Internet threats against the pizzeria would eventually escalate into something much more serious once sufficient and sustained interest was aroused. The peak in Internet chatter before the election, in hindsight, was a likely warning.

Given the level of absurdity involved in this episode and the lack of anything approaching evidence to corroborate the claims made (LaCapria 2016), it might be reasonably expected that most people would soon realize there was never any truth to the story and move on after its exposure in the media. This, however, is not the nature of the legend process, nor was it what happened in this case. Conspiracy theories in particular are notoriously resilient to criticism (Goertzel 2011). Many people remained convinced of Pizzagate and—as is typical with conspiracy theories—public disconfirmation only served to convince diehards of a cover-up in the works. To believers, it seems the media doth protest too much.

Legends are generally false in a literal sense, but they also reveal deeper truths about those who tell them.

As frustrating as this stance may be to those wishing to falsify absurd theories, such a mindset is far from abnormal. Psychological research illustrates how it is difficult for most people to admit they were wrong when they have committed strongly to a belief or course of action. Leon Festinger and colleagues (1956) famously documented how members of a UFO cult doubled down on their belief system after their predicted apocalypse failed to show up on December 21, 1954. The group was saved the trouble (and the cognitive dissonance) of having to admit they were wrong when their prophet conveniently received a last-minute revelation from God via automatic writing. It turned out that the Almighty decided to postpone Armageddon thanks to the cult's faith and devotion. Alex Jones, the extreme right-wing radio show host and conspiracy theorist well-known for promoting claims that the September 11 attacks were hoaxed, inadvertently offered an example of this sort of revisionist postscript shortly after the media storm that followed Edgar Welch's misguided adventure into the pizzeria. In a video posted to the infowars.com website, Jones conceded that the story about a sex ring in the basement was "absurd" without going so far as to disavow it, then promptly suggested that it was a smoke screen used by the media to cover up the "real" revelations found within the Podesta Wikileaks (Jones 2016). By planting and subsequently debunking an absurd story, Jones claimed, the media makes all of the "real" and damning content of the emails seem false by association. This allows him and his devotees to step away from a debunked claim and simultaneously not have to admit they were wrong. All this, despite the fact that the allegedly "real" information in the email is no less absurd and no more substantiated than the sex ring claim (e.g., high level involvement in secret cults, black magic rituals, and so forth). Jones also conveniently overlooked the fact that he himself was one of the primary disseminators of the claims against Comet Ping Pong in the first place. According to his own logic, this must mean that he is actually part of the conspiracy he claims to oppose.

At first blush, the Pizzagate drama seemed so bizarre that it was beyond the bounds of comprehension. It is easy to discount those involved as mentally ill, unintelligent, or perhaps bright but manipulative hucksters. While tempting, doing so would misdiagnose conspiracy theorists, most of whom are mentally healthy individuals (Bost 2015). Moreover, this would result in a missed opportunity to gain a deeper understanding of the situation and others like it. After all, this story is far from unique in its outlandish claims. Whatever the truth may be about the person or persons who initiated the legend, the fact that they took root at all in a wider audience reveals something about them that may help us understand those who entertained the possibility of a Clinton-linked sex slave ring. Legends are generally false in a literal sense, but they also reveal deeper truths about those who tell them, reflecting their "hopes, fears, and anxieties" (Brunvand 1981, 2). Legends about finding a mouse's tail in a soda bottle may not be literally true, but they reveal real concerns about health and safety in industry. People who rank highly in conspiracy ideation also report high levels of support for democratic values and strongly negative attitudes toward authority (Swami et al. 2011). Pizzagate, as a conspiracy legend, reflected these concerns: fears over the trustworthiness of big government, big media, and elites that represent excessive authority and seem to threaten democratic values.

There is a less savory side of the concerns involved as well. A *Slate* article correctly suggested that the very characteristics of Comet Ping Pong that make local leftists love it are what made it a focus for the fears and concerns of the far Right. The place is a haven for artists, punks, gays, and other marginal groups: a tangible emblem of inclusivity, tolerance, and other progressive values that are threatening to the conspiracy-prone alt-Right (Cauterucci and Fischer 2016). Tellingly, the physical signs of these competing values are read differently by those who do not share them. For example, in a "mural of people and faces by an artist who's played the Comet stage, conspiracy theorists see a depiction of a child being strangled. In run-of-the-mill bathroom graffiti, they see secret sexual messages. In the lack of labeling for the gender-neutral bathrooms, haters with a political agenda see 'secret rooms'" (Cauterucci and Fischer 2016).

In a previous era, ice cream parlors evoked a similar fear in some Anglo-Americans (Ellis 2009). Distrustful of the foreign, Italian immigrants who frequently owned the parlors, legend had it that young women risked a morally and physically dangerous slippery slope into drugs and forced prostitution if they visited them. The parallels are striking and troubling. A legend such as Pizzagate can only spread if the regressive values it reflects—nativism, racism, and xenophobia—are alive and well and resonate with a sympathetic audience. Strangely, it also indicates that these values may paradoxically be expressed by the same people who support democracy and anti-authoritarianism, odd bedfellows that may find common cause in populism (Panizza 2005).

Legends, just like fake news, can lead to real-world consequences. In addition, these outcomes can themselves reinvigorate the original legend and encourage its further transmission. Discussion of the Pizzagate claims led to action: online threats and an active shooter. These in turn sparked further debate on social media and in the mainstream media. Whether intentionally or not, this continued discussion may encourage further exploits. Hopefully lessons can be learned from all this. While reputations have been damaged, fortunately no one was physically harmed this time. But rumors continued to circulate over online blogs and videos, threatening comments continued to be posted to the Comet Ping Pong Facebook page, and the possibility for further disturbances inspired by dubious legends remains strong. Within days of the shooting, a fifty-seven-year-old woman named Lucy Richards was arrested for texting death threats to another woman who had lost a child in the Sandy Hook School shootings of 2012. According to the Department of Justice, Richards was convinced by conspiracy claims that the shootings were a hoax and, presumably, that the unnamed victim was somehow in on it (Boxley 2016). With an understanding of the social processes at work in these matters, it can be hoped that we will be better-prepared for the next outbreak of conspiracy-inspired legend-tripping. ■

Note

1. The following summary of the event is drawn from a cross-comparison of several media reports (including Bohn et al. 2016; Kang 2016; Kang and Goldman 2016; and Siddiqui and Svrluga 2016) as well as a report from the Washington, D.C. police (Metropolitan Police Department 2016).

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BECOMING FANTASTIC

Why Some People Embellish Their Already Accomplished Lives with Incredible Tales

ERIC WOJCIECHOWSKI

To increase excitement into what is perceived as a normal, uneventful life, some people create their own personal myths of adventure and accomplishment. These are not just exaggerations of real events, and such narratives can be in the realm of the fantastic.

"There is no shortage of stories from impressive people attesting to the reality of UFO technology or extraterrestrial bodies held in secret at Wright-Patterson Air Force Base, or near Area 51 or elsewhere" (Dolan 2014, 152).

It started with a simple question: Why would otherwise successful, professional people with long, prosperous careers tell wild tales? Why would someone of good reputation, education, and a gainful career embellish their record with incredible adventures? Why would, say, a retired lieutenant colonel with numerous high-level accomplishments in his career, awarded numerous medals and praises from superior officers, why would he upon retirement, start telling people he was part of a team that analyzed the wreckage of a crashed UFO? And why go through the elaboration with painted-in details, citing documents and naming others who were involved? Why would he do this if it were not true?

It seems to me that as someone gains credibility, status, and a reputation, he or she would become *less* inclined to puff themselves up with fantastic tales. Why risk losing it all by going off the reservation and telling incredible narratives? Why would someone do that?

Philip J. Corso, in my opinion, is someone who had an impressive resume. According to his DA Form 66, he was a U.S. Army battalion commander for a time and Chief of the Foreign Technology Division. He was granted numerous awards and decorations and served in World War II and Korea. He then retired March 1, 1963 ("Phillip J. Corso" 2016). But in 1997, he published *The Day After Roswell* where he claimed that when he worked with the Foreign Technology Division, not only did he divvy up Russian and German tech to private companies for back engineering, but he also sent out parts of the UFO Roswell crash as well.

Why would a man of his prestige say such a thing if it were not true?

Philip J. Klass has already taken Corso to task on the book, noting several glaring errors such as Corso's claim that the U2 flights over Russia were, in part, to see if they could fire on us by provoking them and to see if Russia had obtained UFO technology. But most important, he challenged Corso on his claim that the Roswell wreckage sat unattended for fourteen years until he was allegedly put in charge by General Trudeau. Klass notes:

> [Choosing] Corso for this task is surprising because Corso did not have even a bachelor's degree in science or engineering. (He had majored in Industrial Arts at a teachers college prior to being drafted in 1942.) One would expect Trudeau, or one of his predecessors, to have thought of turning the Roswell debris over to some of the many very competent scientists with Top Secret clearances then employed in Army research and development laboratories. (Klass 1998)

Is Corso a guy who sought secret clearances, secret projects, and late-night phone calls like Neo received from Morpheus in the movie *The Matrix*, only to have never received them? Did he put in his time only to come to believe he was never quite rewarded as he felt justified? In other words, did he embellish his career wildly years after retirement to compensate for twenty-one-years of "normal" service? Are there some people who regardless of their accomplishments never seem to see themselves as accomplished unless it's truly fantastic?

Robert O. Dean is another person with a quality resume. He had a career in the United States Army, starting in 1950 and retiring in 1976. He was in the wars of Korea and Vietnam and highly decorated for his service. He was at NATO headquarters from 1963 to 1976 with a rank of master sergeant (Klass 1997).

Watching Robert Dean "evolve" over the decades has been quite an adventure in itself. During his first appearances, he claimed that while at NATO he was an intelligence analyst and that one evening when he was tired and could not stay awake, a senior officer tossed him a thick manual and said this would keep him awake. Said manual supposedly documented a three-year study by NATO on UFOs and extraterrestrials. He said it was called "an assessment," which concluded that there were several races of extraterrestrials flying around and landing and making face-to-face contact with people. The aliens were, however, not a threat (Nintzel and Acuna 1995).

Corso claimed that when he worked with the Foreign Technology Division, not only did he divvy up Russian and German tech to private companies for back engineering, but he also sent out parts of the UFO Roswell crash as well.

Of course, Dean never produced this report for inspection. Philip Klass found no such study had ever been undertaken by NATO and that Dean's record showed nothing of intelligence training, but that he was a Chief Clerk in the Language Service Branch (Klass 1997). Again, as in the case of Corso, it is doubtful a person with Dean's actual rank and status would be so casually tossed the most important "Cosmic Top Secret" (which he called it) report just to keep him awake when a cup of coffee would do.

Over the years, Dean has given several lectures and interviews that, thankfully for us researchers, have been uploaded to YouTube. The preservation of this material is invaluable. Over the years, we can see how Dean expands his story and adds extraordinary pieces. And of course, all claims come with no way to verify them.

In one interview, he claimed he now has personal contact with extraterrestrials, to have been "taken off world" where they gave him "encouragement" and showed him the future. (Project Camelot 2016). In a 2010 lecture, he reported he was now remote viewing (Vimanaboy 2016). In another interview, he claimed a Navy Seal team was dispatched to the "Ararat Anomaly," which was a large boat, and after several days of exploration, the team was extracted via helicopter with several "anomalous artifacts that have never been described or named" (Project Camelot 2008). All of these incredible claims are provided without a shred of evidence.

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How about a nonmilitary person with impressive accomplishments? What of Dr. Steven M. Greer? He earned a medical license in 1989, had a career as an emergency room doctor, and held the position of chairman of the department of emergency medicine at Caldwell Memorial Hospital in Lenoir, North Carolina. He gave it all up in 1998 to pursue his UFO Disclosure Project (Greer 2010), headquartered in Crozet, Virginia.

Telling his origin story in 2006, Greer says that in October 1973, he was at the top of Rich Mountain, 5,000 feet above the town of Boone, North Carolina. Before he meditated, he witnessed an extraterrestrial's vehicle that was like one he saw at the age of nine. He then meditated so hard he entered into a state of consciousness similar to a near-death experience he had years earlier. When he started to walk down the mountain, he was greeted by an extraterrestrial. He and the ET went aboard a craft that was out in space and translucent, allowing him to see space all around him. Greer claimed the extraterrestrials wanted to communicate with someone who could meditate like he does, and they were concerned for a peaceful human race and were looking for ambassadors, which Greer agreed to become (Greer 2006, 23–24). He was then returned to Earth and descended the mountain at steps of "leaps of 20 to 30 feet at once" and his physical body *actually* was light! (Greer 2006, 26).

None of this was revealed in Greer's early UFO days when he appeared on *Larry King Live* in 1994. When King asked him, "How did you get into [UFOs]?" He said he had an uncle who worked on a project for an Apollo mission, was himself interested in space, and that he had a UFO sighting himself (StevenGreerArchive 2013). He makes no mention of multiple sightings, no mention of being taken up in space, and no springing down the mountaintop in a body of light. Furthermore, when King asked him if he's made any contact, he said, "We have had limited exchange by light signaling and graphic signaling . . ." (StevenGreerArchive 2013). Then, after explaining the signaling, he says, "there have been reports of more advanced communication but . . . any craft capable of getting here from another star system is not gonna have technology that would be used by AT&T so we have to keep an open mind about what modalities of communication might be out there" (StevenGreerArchive 2013).

Wouldn't *this* have been the place for Greer to have told King what he tells us in the 2006 book? When King asks him how he knows extraterrestrials have no hostile intentions and wish to establish a liaison with them, instead of telling King what he tells us in his 2006 book, Greer answers that he knows this because he's ". . . personally been within a few hundred feet of these craft …" and then the talk about signaling. Finally, King takes a caller from Petoskey, Michigan, who asks if there is proof of alien abductions where people are taken and returned. Greer says, "I think it is extremely rare that anyone is taken onboard [UFOs] . . . It is much rarer than what UFO followers would have you think" (StevenGreerArchive 2013). Another missed opportunity to have discussed his own as told in 2006, I guess.

Greer claimed he had the opportunity to "brief" CIA director James Woolsey on the subject during a dinner party, but Woolsey, along with three other signatories to a letter on the matter, explained that Greer took polite conversation and questions as affirmation of his view when in fact, it was not (Letter to Greer 1999). Why would a CIA director need Greer's briefing anyway? But that's not all: He told podcaster Joe Rogan that he was asked by "someone senior involved with [President Obama's] team [to provide a UFO briefing]" (PowerfulJRE 2013).

To my knowledge, none of the people I have discussed here started out with tall tales. None of them, to the best of my knowledge, fibbed on their resumes to get into the military or medical school. We're talking about people who already had impressive resumes who seemingly needed to embellish their work and life afterward. Why? Since no proof has been provided to substantiate the above-noted claims, our answers will have to be sought elsewhere.

There are many reasons people lie: to avoid punishments, wish fulfillment, as acts of aggression, to gain favor, to feel powerful, to put one over on others, to not hurt others' feelings, and so forth. What I'd like to focus on that appears the most relevant to this study is what is called "pseudologica fantastica," otherwise known as pathological lying.

This has been defined as

> the repeated utterance of untruths; the lies are often repeated over a period of years, with the lies eventually becoming a lifestyle; material reward or social advantage does not appear to be the primary motivating force but the lying is an end in itself; an inner dynamic rather than an external reason drives the lies, but when an external reason is suspected, the lies are far in excess of the suspected external reason; the lies are often woven into complex narratives. (Dike et al. 2005)

There may or may not be a neurological defect behind why someone would engage in this behavior (Ford 1999, 136; Dike et al. 2005). In other words, perfectly "normal" people, even those with true and proven accomplishments, may engage in this behavior.

As an example, witness Judge Patrick Couwenberg who in 2001 was investigated by the State of California Commission on Judicial Performance for constant lies during the course of his duties and for outright lying to the Commission, claiming he was employed by the CIA, taking part in operations in Southeast Asia and Africa and that he had a master's degree in psychology. None of this was true (Dike et al 2005).

Also witness another judge, Judge Jack Montgomery, in the State of Alabama. Through an FBI investigation in 1992 and subsequent trial for taking bribes, he was found to have told some outlandish lies. He claimed to have been the first herpetologist at the Birmingham Zoo and to have been a tortured prisoner of war in China in the Korean War. None of this was true (Ford 1999, 134).

Some people do embellish their already impressive careers and lives with fantastic adventures and accomplishments, and they seem to do so for no other reason than for the sake of telling the lie itself. So, when you hear that a wild story must be true because the person is not out to seek financial rewards or might actually risk a social standing, those factors aren't a part of the equation.

So why would anyone embellish their lives with UFOs? It works great for those making up a unique life. It accomplishes at least two things: first, it's pretty cool (to this author) and second, the vaguer and more unverifiable the claim, the less likely it is to be proven a fraud. It's the same game played by televangelists. Someone who claims to have been in contact with aliens or to be speaking to God holds all the cards. You can't ever with 100 percent satisfaction conclude a fakery, unlike someone who may fib research results in a lab that can be easily duplicated and retested by other scientists. Making claims that you were once allowed to review secret dossiers and reports of contact with aliens, claiming you handled UFO wreckage but couldn't keep any—all of these are difficult to prove conclusively one way or the other. Plus, in regard to UFOs, the mythology of a military/government cover up has been in place since the beginning of the modern UFO era—1947. All one has to do is plug their narrative into it. It already has an audience.

Are Phillip J. Corso, Robert O. Dean, and Stephen M. Greer engaging in make-believe as described above? I don't know. Either they are telling something truthful or they are not. It's quite possible all three truly believe what they are saying and not consciously lying. But in any case, it is up to them to bring forth the evidence, which they have not. If their extraordinary claims are false (and they appear to be), then the only explanation appears to be a psychological one speculated here, a need to embellish a rather "normal" career, a need to make their lives more exciting than they actually are perceived to be (by them), a wish fulfilled.

I remember my time in college, bright-eyed, out to change the world. I imagine lots of young people have the same world outlook. College or military or none-of-the-above, we all want great things for ourselves when we journey into adulthood. Is it possible that once we move into the real world and most of us feel like we've led "normal" or otherwise "uneventful" lives we start making stuff up? If we take financial gain out of the equation, the only other solution as to why this happens is that the person is making up for a perceived failure to be part of something greater.

To answer my question that started all of this: yes, sometimes otherwise accomplished people will invent tall tales for any number of reasons. Some choose great war stories; others choose to embellish their personal narratives with great adventures with UFOs. ■

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Ten Questions (and Answers) about Teaching Evolution

A high school biology teacher asked the Richard Dawkins Foundation for Reason & Science (a division of the Center for Inquiry) a series of questions about teaching evolution. Bertha Vazquez, director the foundation's Teacher Institute for Evolutionary Science (TIES), answered. We thought her answers deserved sharing with SKEPTICAL INQUIRER *readers.*

BERTHA VAZQUEZ and CHRISTOPHER FREIDHOFF

1. What do you think are the main factors that influence how effective a biology teacher is at teaching evolution?

It's all about content knowledge. A teacher should know the definition of a scientific theory, current examples of evolution, and, as a result, have confidence when teaching the subject.

2. How does evolution education differ from country to country?

Our teachers [in the United States] have to constantly defend evolution. That's not the case in most first-world countries. Like Richard says in The Greatest Show on Earth, it's like a professor of Roman history having to defend the existence of the Roman Empire every year, year after year. I'm not as familiar with other countries, but as far as the United States is concerned, I am getting published soon in a journal titled *Evolution: Education and Outreach*. I did a comprehensive state-by-state comparison of our nation's middle school science standards. It is now available online at https://evolution-outreach.springeropen.com/articles/10.1186/s12052-017-0066-2.

3. Why is it important for students to understand evolution?

Evolution is cool! It's a beautiful web that underlies biology, making everything connected. It explains the history and diversity of all of the amazing life on Earth. And, in a practical sense, it helps us develop new medications and plays a key role in conservation of ecosystems.

4. What type of evidence is important for students to view in a biology classroom?

It is important that they understand that there are multiple lines of evidence for evolution all leading to the same conclusion. Evidence for evolution comes from many areas, including the fossil record, the law of superposition, biogeography, artificial selection, homologous structures, vestigial organs, and genetics. Teachers should definitely cover phylogenetics.

5. What techniques should be used for teaching evolution?

Make sure students understand scientific inquiry first and how science finds answers through observation, experiments, data collection, and sharing results. Try hands-on activities—and it's very important to use

modern-day examples of evolution, not just Darwin and his finches. For middle school teachers, try the TIES Online Learning Page (the hands-on labs are available for free download and come with instructional videos to guide new teachers). For high school teachers: HHMI BioInteractive is the gold standard.

6. What is your opinion of biology teachers who don't accept evolution?

They do not understand how science finds its answers and are doing a terrible disservice to their students.

7. At what point do you think students should be exposed to evolution?

Students should be exposed to evolution in elementary school. There are some exceptional states that start in early elementary. For example, in Massachusetts, their PreK–2nd Grade standards document reads that students should "Look at a variety of fossils or pictures of fossils, including plants, fish, and extinct species. Guess what living organisms they might be related to." This is wonderful. Evolution ties the life sciences together and is the perfect thread. "Without evolution, life science is just stamp-collecting." These youngsters will begin to see the big picture early. Even pre-schoolers can begin to understand how living things share a common history. I recommend *Grandmother Fish: A Child's First Book of Evolution* by Jonathan Tweet for this age group.

8. With the current administration, how do you think science education, mainly evolution, will change?

Americans are becoming more accepting of evolution. The people President Donald Trump has hired and the decisions being made will slow down this positive trend. (See, for example, Florida SB 989, which went into effect on July 1, 2017. It allows any county resident—not just parents—to challenge materials used in the public schools. The law doesn't mention evolution or any other topic in particular, but it requires school districts to set up a formal process to field complaints from any resident about the content of educational materials. Any Florida citizen can challenge the teaching of climate change, evolution, you name it.) Darwin said, "Ignorance begets confidence more often than knowledge." People who do not know what they are talking about will make decisions that will hurt us as a nation. The United States has been a wonderfully innovative and scientifically curious country; this is one of the most wonderful things about our great nation. I'm worried that scientific discoveries and the economic benefits that accompany them will begin happening more in other countries. Look at green technology, for example, and how much profit there is to be made in that field! We are not taking advantage of it just so the fossil fuel industry can continue making profits. Imagine if the candle-makers had impeded the promotion of Edison's light bulb! It's tragic.

9. How should the education of science teachers change to have more effective teachers in the classroom?

We have become an assessment-mad culture, with too much emphasis placed on test scores. In my district, teaching practically shuts down for six weeks so all of the tests can be administered. Instead of so much emphasis on teaching teachers how to analyze test data, give them content knowledge on the science topics they must cover. Emphasize hands-on activities and lessons that highlight the scientific method. I know it's costly, but new teachers should have time to observe worthy veteran teachers for as long as possible.

10. What challenges do students who don't accept the evidence of evolution face when they go to college?

I stress the way science finds its answers to questions about the natural world around us. Evolution is an elegant example of how thousands of repeatedly tested hypotheses, countless observations, and collaborations over 170 years led to a big idea in science. Not accepting evolution can be a handicap because it means you do not understand how science works. ■

Bertha Vazquez, a biology teacher herself, is director of the Teacher Institute for Evolutionary Science (TIES), Richard Dawkins Foundation for Reason & Science, a division of the Center for Inquiry.

Christopher J. Freidhoff is a high school biology teacher in Pennsylvania. He presented these questions as part of a college Research Methods class. Published here by permission of all involved.

Critical Thinking and Parenting

How Skepticism Saved My Special Needs Kid from Certain Death

You are a skeptic, and your child has autism. How do you react?

AMY FRUSHOUR KELLY

As a skeptic, I try to view the world in a rational way, but I'm also a parent, which means I'm insane.

In April 1995, I became very ill. My doctor performed tests and found a parasite dwelling in my abdomen. I was overjoyed. During the infestation, I experienced nausea, exhaustion, and frequent urination. Finally, I endured hours of excruciating pain, culminating in surgical extraction. Afterward, I hugged the parasite and named it after a dead poet. I brought it home, cuddled it, and bought it many nice toys. The parasite emitted piercing screams and soiled itself. I found this encouraging and took many photographs.

Twenty-two years have gone by since the infestation. The parasite lives in my house and downloads music from iTunes without my permission. I'm a rational person, but I'm smitten. I'd do anything for her.

She is my daughter, Emily. She's disabled, and she's anything but a parasite to me.

Meet the Parents

When it comes to skepticism, parents of children with disabilities are a special case. Special-needs parents are particularly vulnerable to fraudulent claims and quack medicine and are often shamed for not trying alternative cures. Imagine: your child has been diagnosed with a chronic condition that cannot be cured. Everything you'd hoped for your child—to grow up to be a happy, healthy, independent individual—has been taken away. You mourn the child you expected to have while still trying to be the best parent you can be for the child you do have. Special-needs parenting requires extraordinary commitments, among them:

Time. Parenthood demands taking time for your kids, obviously. Special-needs parenting demands more. Time for therapy, doctor's appointments, time off work. If you have other, healthy children, you have to balance the time you spend with your special needs kid with time spent with their siblings.

Money. Insurance never covers everything. You still pay for medication, adaptive equipment, after-school care. Even if your child receives social security, it doesn't go far. You may have legal fees, for example having to set up a special-needs trust. Save all you can so when your child becomes an adult, she or he will be well cared-for. Try not to think what will happen when you're not there anymore.

Energy. You probably work a forty-hour week. Your spouse (if you have one) probably also works. And you have a home. And children. So you come home from work to deal with your kids' needs, cooking, cleaning, and homework. You're probably dealing with all this as a single parent; 80 percent of marriages with special-needs kids end in divorce (Thorpe N.d.; Anderson et al. 2007). Extended family can ease the burden, but the stress is still phenomenal.

There's joy, too. You get excited over every milestone and bond over silly stuff like any other family. Ultimately, this is your child, and you'll do whatever it takes to help this kid grow up as safe, happy, and healthy as possible. If this means sacrifices or trying things that are a little out of your comfort zone, fine.

So when someone tells you about a cure they heard about for your child's disability, your guard is down. It's easy—and probably expensive—but it's a *cure*.

This messes with your head in two ways: obviously, the happy (but unlikely) possibility that your kid can be cured, but also the guilt and shame you'll feel if you don't try it. The implication of the existence of a cure is that it's within your control. What happens if you don't try this new treatment? Maybe your child won't get better. You could have done something, and you didn't…. Shame on you for not even trying. What do you do?

Seizure the Day

When my two-year-old daughter was diagnosed with autism, it broke my heart. Every night, I drove myself nuts researching autism treatments. I was a classic special-needs parent: constantly stressed out, reading everything I could find on the subject, and desperate for answers to fundamental questions: Why does she have autism? What can I do to mitigate it? How do I advocate for her?

When Andrew Wakefield's now-discredited paper posited a vaccine-autism link, I was cautiously optimistic, and then disappointed to learn Emily's MMR vaccine hadn't contained thimerosal. While our experience with the vaccine claim was quickly debunked, not all autism parents had that comfort. I'll never forget hugging another parent as he sobbed with guilt because he'd held his daughter down for the injection that (he thought) might have caused her autism.

It seemed like there was a new treatment or cure every month. When I didn't try treatments that seemed experimental or quackish, I felt guilty. Other parents admitted feeling the same way. But Emily was growing up healthy and happy, even without woo. I eventually stopped feeling guilty for not jumping on treatments that seemed iffy.

In February 2009, Emily experienced a tonic-clonic (grand mal) seizure. At the emergency room, I learned that about 25 percent of children with autism experience at least one seizure by the time they reach adulthood (Brain Injury Association N.d.). Later that year, after her second seizure, she received her epilepsy diagnosis. With medication, she was fine. In July 2012, two months shy of being seizure-free for three years, Emily had a complex partial seizure. A twenty-four–hour video EEG revealed abnormalities, spikes in brain activity, and subclinical seizures during sleep. We adjusted her medications with every seizure. Since then, the frequency and duration of the seizures has increased. Epilepsy is here to stay. As I write this, she averages about one episode a week, and now has simple (conscious) partial seizures as well. Fun.

It's easy to joke, to refer to my daughter as my parasite. But Emily's my only child, and like other special-needs parents, I tend to go overboard on her behalf. When her seizures returned in 2012, I found an article from the *Journal of Child Neurology*, which terrified me: "when epilepsy and autism occurred together, the mortality rates increased by more than 800 percent" (Pickett et al. 2011).

I also discovered something called Sudden Unexplained Death in Epilepsy (SUDEP). The cause of death is unknown, but subclinical seizures during sleep are suspected (Sudden Unexpected Death, N.d.; Sperling 2001). Just like Emily. Being a parent (and therefore insane), I became hysterical. Our neurologist was sympathetic but not encouraging. Even with heightened risk, SUDEP is extremely unlikely. What I heard was: Emily could *die*!

I fixated on the 800 percent increased mortality rate, calculating average mortality for an American female (Xu et al. 2007) and multiplying to estimate a 0.00416 percent chance of early death. So Emily's in more danger of dying in a car accident than of SUDEP. Not so bad, right? But emotion made it difficult to differentiate between the reasonable collection of data for information and the hysterical collection of data because *oh my god, she's gonna die!* The statistic I got my number from was based on females who were in good health, but what counts as good health? I did more frantic research and arrived at a statistical mortality rate of 0.00041 percent (Minino 2010), 800 percent of which is 0.00326 percent. Reasonable, right? I could relax.

Or could I? Statistics are useless when it comes to individuals. Besides, what if I did my math wrong? The parental part of my brain had turned into a raving lunatic. But my reasoning was flawed. My starting premise was "she's gonna die," a far cry from "my daughter has a relatively common seizure disorder, and she will in all likelihood be fine."

I'm literally a card-carrying skeptic, and even I had trouble discerning actual danger from what wasn't dangerous. Can you imagine how much harder it is for the average special-needs parent?

Parents Again

Emily likes to go bowling or see movies with her friends, who also have autism. We parents drive them and chat while the kids have fun. Sometimes we discuss past treatments. Some gave their kids vitamins or special diets. Some tried chelation or hyperbaric therapy. They've all been burned at one time or another by pseudoscience and have all spent thousands of dollars. They're all cynical about autism treatments yet—ironically—when they learn about Emily's epilepsy, they don't hesitate to make suggestions based on something they saw on the Internet: Have we tried melatonin? The ketogenic diet? Aromatherapy? Medical marijuana? (One parent actually tried to give me a vape kit and cannabis oil—which is illegal in the state where we live.)

Separating the wheat from the chaff isn't easy, especially when you're dealing with the pressures of parenthood and disability. This makes us all the more vulnerable. Furthermore, different doctors make different recommendations. Emily's pediatrician had different recommendations than

the pediatric neurologist. When Emily switched to an adult neurologist, he had a slate of new protocols to run through. While we've been careful to stick with evidence-based medicine, many medical professionals don't. When the line between hard medicine and woo is blurred, it's confusing. Just recently, Emily's school sent home a flyer for a new integrated medicine center for autism, where patients can receive reiki treatments while they get speech therapy. With woo consistently lumped in with evidence-based medicine, how can parents know how to tell the good from bad? How do we protect parents—and kids—from quack treatments?

How do parents know to ask these questions? Education is a good place to start. Let's see famous figures on television explaining those questions and why evidence-based medicine is so important.

Vet the Net

There are certain questions we should always ask whenever a treatment is publicized anywhere: (Using Trusted Resources 2015)

Who manages this information?
Who posted the information? Are they generally reliable? Is it a medical organization, a pharmaceutical corporation, or a private individual?
Who's paying for the project, and what's their purpose?
What's in it for the organization that's paying for the website or study this information comes from?
What's the original source of the information?
Did the authors research their topic in medical journals? Are multiple sources cited?
How is information reviewed before it gets posted or publicized?
Peer-reviewed medical journals are a good start. The National Institutes of Health, Cancer.gov, and CDC.gov also provide peer-reviewed information with links to sources.
How current is the information?
Medical research is conducted constantly all over the world. Start with data based on recent findings and work your way back. If a treatment was popular in the 1800s then fell out of use, it's probably because a more effective or reliable treatment exists.

How do parents know to ask these questions? Education is a good place to start. Let's see famous figures on television explaining those questions and why evidence-based medicine is so important. For most first-time parents attend birthing classes, parenting classes, etc., let's add a lesson: how to evaluate medical information. The National Institutes of Health has excellent video tutorials to help people assess results of Internet health searches (Evaluating Health Information 2017). We can guide parents through these tutorials before their children are even born. And brochures and posters can illustrate the basics of how to locate and identify valuable health information. Make them available from obstetricians, pediatricians, and school nurse offices.

Finally, let's advocate for the inclusion of this information in public school health education programs. Teach kids how to perform a useful Internet health search while they're still in school. These lessons will stay with them when they become adults—and parents—themselves. ■

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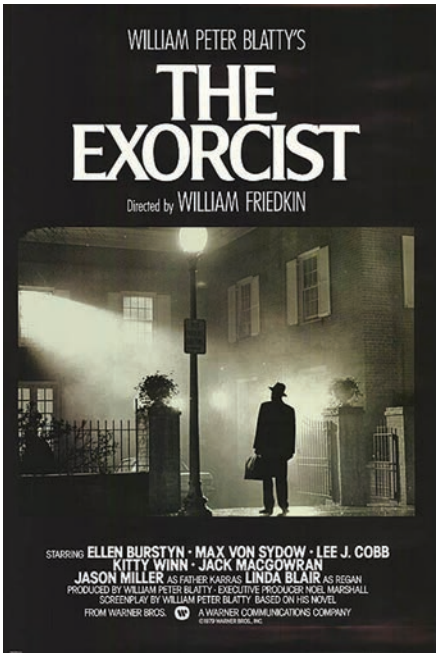
Hollywood Curse Legends

There are many myths behind movie lore concerning jinxes and mysterious deaths, but a closer look reveals these curses to be attributable more to publicity and rumor than to the supernatural.

BRETT TAYLOR

Hollywood, myth-infused home of the movie industry, is like any other town in that it has its share of curses and mysterious legends. Stories about cursed productions take on a life of their own, making horror movies in particular seem even more ominous and frightening than if they were just works of entertainment.

When a movie deals with the subject of demons, it is all too easy to believe in a curse. Be it superstition or not, many people believe that merely dealing with occult subjects, dabbling in them, is a sure way to invoke malevolent forces. The legend of the curse surrounding the film *The Exorcist* can be traced to promotional materials, specifically book tie-ins, including Harold Newman's *The Exorcist: The Strange Story Behind the Film*. Blame might be more correctly placed on the book's publishers, Pinnacle Books, for their marketing. Two fatal incidents related to the production are noted in Newman's book. The most pertinent is the death of actor Jack MacGowran from influenza. It is something of a stretch to blame MacGowran's death on *The Exorcist*, as he died on another continent four weeks after all his scenes had been filmed. Then there was the death of the brother of actor Max von Sydow, which the veteran actor learned of during the shoot. As with MacGowran, the death occurred in another part of the world, Scandinavia. It is even more of a stretch to blame this on *The Exorcist*.


WILLIAM PETER BLATTY'S
THE EXORCIST
Directed by WILLIAM FRIEDKIN
STARRING ELLEN BURSTYN · MAX VON SYDOW · LEE J. COBB
KITTY WINN · JACK MACGOWRAN
JASON MILLER AS FATHER KARRAS LINDA BLAIR AS REGAN
PRODUCED BY WILLIAM PETER BLATTY · EXECUTIVE PRODUCER NOEL MARSHALL
SCREENPLAY BY WILLIAM PETER BLATTY BASED ON HIS NOVEL
FROM WARNER BROS. A WARNER COMMUNICATIONS COMPANY

Newman's text is actually a bit more circumspect in its implications. As for near-fatal occurrences, the most dramatic is the one that opens Newman's book, an accident that nearly claimed the life of Jordan Miller, the five-year-old son of actor Jason Miller (who played Father Damien Karras). Newman certainly has no problem with sensationalism or any hesitancy about spreading rumors. But he stops short of explicitly

endorsing them (Newman 1974).

Critic Mark Kermode claimed that William Friedkin, director of *The Exorcist*, "played up" these sorts of rumors, especially MacGowran's death, presumably as a means of publicity. Questioned by interviewer Michael Doyle, Friedkin denied Kermode's claim. "He's wrong," said Friedkin, before going on to elaborate: "I never 'played up' rumors of an *Exorcist* curse, although the idea of such a thing has been around almost since the beginning of [production on] the film. No, people like Ellen Burstyn played up those rumors, not me. I did everything I could to deny the existence of a curse and I don't accept the idea now." The director indicated that an actor expiring after a shoot was less unnerving than having an actor die on the set: "Yes, there were strange things that went on but there had been stranger and more troublesome events that have occurred on movie sets—like people dying during the course of shooting." An agnostic, Friedkin concluded, "Personally, I don't believe in curses, but I've only mentioned them because you just asked me about *The Exorcist* curse—as many others have over the years" (Doyle 2013).

YOU HAVE BEEN WARNED
IF SOMETHING FRIGHTENING HAPPENS TO YOU TODAY, THINK ABOUT IT
IT MAY BE
THE 666 OMEN
GREGORY PECK LEE REMICK
THE OMEN
A HARVEY BERNHARD-MACE NEUFELD PRODUCTION
DAVID WARNER BILLIE WHITELAW
MACE NEUFELD HARVEY BERNHARD RICHARD DONNER
DAVID SELTZER JERRY GOLDSMITH

Despite such denials, Kermode seems to have had a reliable source in the late William Peter Blatty, who wrote and coproduced *The Exorcist*. Blatty was a believer in the afterlife and gave some credence to the notion of supernatural forces, yet he dismissed the much-ballyhooed *Exorcist* curse as purely Friedkin's invention. Surprisingly, he does not accuse the director of inventing the legend for publicity purposes. Instead, he believes Friedkin needed an excuse to explain the production's numerous and costly delays to impatient (and penny-pinching) executives at Warner Brothers. The motivation Blatty ascribes is faintly laughable, as it's hard to imagine many cynical Hollywood producer-types being moved by a director blaming budget overruns on supernatural forces, possibly including the devil (Kermode 1998).

The curse as a publicity tool certainly reared its head with *The Omen*, an expensive attempt to rekindle the kind of unholy profits summoned by *The Exorcist*. Once again, we have the death of a movie star's relative; in this case Gregory Peck's son shot himself. This death has only a tenuous link since it occurred two months before Peck began the film. The movie was cursed from the beginning, if we are to believe Bob Munger, the religious adviser who came up with the idea for the film.

If Satan was indeed behind the *Omen* curse, then it was surely one of his cruelest curses, or most random, as it also involves mass death resulting from a plane crash. The problem with attributing the crash to a curse is that the plane was never actually used in the movie. It was *scheduled* to be used in the movie, but the producers decided to use a different plane for aerial photography, whereupon the original plane crashed upon takeoff, killing all on board. Satan, it seems, was unaware of the change in planes. If there was a curse, then that means a number of people were punished, not for being associated with the movie but for riding on a plane that was *almost*, but not quite, associated with the movie.

Director Richard Donner scoffed at any supernatural notion: "I say no, it's just an incredible coincidence. There are those that would like to think about it, that it's something more. And when the publicity department at Fox got their hands upon it, we all said, yes, it's *The Omen*, because we're all selling our movie" (*Curse or Coincidence?* 2006).

Movie rumors are sometimes spread by shadowy sources. The tabloid *National Enquirer* used anonymous sources in a story about mysterious events relating to the *Poltergeist* movies.

An unnamed source, supposedly "close" to the series, was quoted thus: "The films have been plagued by such problems and tragedies that it really makes you wonder if somebody—or something—was trying to tell us something" (George et al. 1988). This source could have been anybody from a studio executive to a lowly crewmember to someone in the publicity department. Or, given the *Enquirer*'s track record, the quote could have been fabricated.

Certainly the films are associated with a number of untimely deaths. But if someone was trying to send an occultic message, who were they and what was the message? Urban legends provide a partial explanation. When word got out that the skeletons seen in the original film's climax (described below) were actual cadavers, a story began that the misuse of corpses was at the root of the resulting occurrences. This explanation is ironic, in that the movie uses similar disrespect for corpses to explain the poltergeist activity.

Actress JoBeth Williams seems to have been a major factor in spreading these rumors. While chatting on Johnny Carson's *The Tonight Show* to promote Brian Gibson's *Poltergeist II: The Other Side*, Williams claimed that actual corpses were her costars in the original film. In *Poltergeist*, Williams falls screaming into a swimming pool full of muddy water and grotesque skeletons. Production of the second film was only rescued from preternatural turmoil because the filmmakers called in an Indian shaman to the cave that provided the setting for the film's climax. He performed a ceremony that apparently appeased the spirits, temporarily at least. In more recent interviews, Williams often reminisces about coming home from the first film to find the picture frames on her wall mysteriously slanted.

Williams has admitted being terrified during the swimming pool scene—attributing her fear not to the fact that she was swimming with corpses but because she feared electrocution. It seems bizarre that real corpses would be used in an expensive Hollywood production, yet the film's makeup artist, Craig Reardon, swore under oath that thirteen of the swimming pool corpses were real (Furtney 2013).

Author James Kahn, enlisted to write the novelization of *Poltergeist*, claimed to be haunted by "actual poltergeist events" while writing the novel, or so he has been quoted by the *National Enquirer*. When asked directly, the author is not quite so dramatic: "I'm not really a believer in paranormal experiences, as such," he told me in a 2013 Facebook message.

When little Heather O'Rourke (the girl famously depicted with her hands on a haunted television on *Poltergeist* posters) died from a bowel defect at the age of twelve, the *National Enquirer* didn't wait long to attribute the actress's death to a supernatural cause. The most popular U.S. tabloid cited "bizarre events on the sets of the films—including vanishing scripts and mysterious problems with a sound track." Apparently disappearing scripts were a recurring theme on the first film, with the copies belonging to actresses Zelda Rubinstein and JoBeth Williams all vanishing at some point.

The sequel, *Poltergeist II: The Other Side*, led to more mysterious script disappearances. Actor Will Sampson, of the Creek Nation, performed a spiritual ritual to cleanse the house used for shooting of unclean spirits. Supposedly this was due to his conviction that the house was full of mysterious malign threats, but the act nonetheless has the air of a publicity stunt. Julian Beck, a legend of bohemian theatre, died at the age of sixty, soon after filming his creepy portrayal of an evil reverend. Beck had been diagnosed with abdominal cancer at least a year before, so his death was hardly unexpected (Folkart 1985).

College-age Dominique Dunne was strangled by her ex-boyfriend right after making the first *Poltergeist*, but fate allowed little Heather O'Rourke to live to make two sequels. If some supernatural force wanted her dead, why would it wait so long? Why would it single out the two young girls of *Poltergeist* but allow the boy, Oliver Robins, to live? What supernatural criteria are at work here? Robins is on record as not believing in the curse. As he put it:

> There wasn't anything abnormal from any other set I'd ever been on. There are always technical problems, but people always want to bring those elements together because it's a ghost movie and it's easy to connect the dots. People want to believe it's haunted or it's cursed, when the fact is those same things happen on almost every other set. For instance, they said on one of the *Poltergeist* installments the film got fogged. Well, that happens all the time; when I was in film school that happened to me all the time. It's just a technical error, you know. Of course it's fun to talk about because of the ghosts in the movie. (Rob 2009)

Nor does Steven Spielberg believe in the legend. Asked by *People* if anything eerie happened on the set, he answered:

> No. But this wasn't a demonic possession movie like *The Exorcist*. This was more about aspects of life after death. Sure, lights fell, and people bumped into each other on darkened sets. And people fell into the swimming pool next to the house the main characters lived in. But those kinds of things happen on a Neil Simon film. (Calio 1982)

Some movies are said to be cursed in some vague way due to unfortunate circumstance. *Rebel Without a Cause* is sometimes called the most cursed film of all due to the high number of deaths associated with it—deaths of actors that is. Yet these deaths occurred years after the film was released. Nick Adams died in 1968 and Sal Mineo in 1976. The last death, Natalie Wood's, occurred almost three decades after *Rebel* was shot. Director Nicholas Ray went on to live another two and a half decades, though by then his career was long decimated by a life of self-destruction. But if there is a curse on *Rebel Without a Cause*, why? Is God punishing the filmmakers for their wild lifestyles? If so, why did Dennis Hopper, no stranger to excess himself, go on to live for decades, eventually staging one of Hollywood's biggest comebacks in the eighties? Hopper is practically the only member of the youthful cast not to be bisexual, giving God's wrath a Sodom and Gomorrah-like overtone, if indeed he is the deity responsible for all this senseless dying.

Brandon Lee's death on the set of *The Crow* might be easier to write off as one more movie accident were it not for the eerie parallels with the death of Lee's father, martial arts great Bruce Lee. Bruce's death was already shrouded in mystery. For the world's greatest athlete to suddenly die of a brain embolism at a young age was too much for some fans to take, and rumors spread that he'd been felled by a "death touch," assassinated by traditionalists outraged that Lee had spread their secrets in the West (Halland 1985).

The idea of martial arts gangsters sneaking an assassin onto a North Carolina movie set and taking out a budding action star is ridiculous but theoretically possible. Yet no evidence of foul play has ever turned up. As far as can be determined, a crew member simply loaded a gun with a real bullet instead of the fake he was supposed to use. New Line Cinema's cost-cutting non-union tactics, built on a foundation of fatigue-inducing sixteen-hour shooting days, were a recipe for disaster when combined with dangerous stunts, and had already led to the electrocution of a carpenter and the disfigurement of a construction worker's hand.

Even unmade movies are the subject of mystery-mongering lore. A humorous story about an Eskimo is the unlikely source of the most famously cursed unmade script of all. Todd Caroll of *National Lampoon* adapted a satirical novel by Mordecai Richler, *The Incomparable Atuk*, into a film script. Dwarfish and fat, the embittered ex-preacher standup comic Sam Kinison was about as unlikely as a movie star can get. The film was shut down after a single day of New York shooting in February 1988 ("Film Production Notes" 1988). No mysterious force was behind the film's cessation. Kinison never bothered to read the script, telling friend Joey Gaynor he'd read it when he got to the set. He must not have liked what he read. Shutting down production was an extremely risky act on Kinison's part, as breach of contract does not sit well with the studios. United Artists slapped Kinison and his manager Elliott Abbott with a lawsuit, demanding $4.6

million in actual damages plus another million in punitive damages ("Shrieking Comic" 1988).

None of this is particularly eerie, but here's where curse lore comes in, taking the form of a story that the *Atuk* script means certain death—that it in fact killed not only Kinison but also other comic actors who had considered the role. It seems that John Belushi, John Candy, and Chris Farley were also victims of *Atuk*. Keep in mind that Kinison didn't die until three years after the one-day shoot, making this a somewhat delayed curse.

We all like to attach special significance to the events in our lives to make our lives appear unique. We like to see ourselves as worthy of attracting preternatural attention.

As far as I can tell, the story of the *Atuk* curse can be traced back to Doug Draizin, the producer who first offered the screenplay to Kinison. Draizin seemed to have a meager foundation upon which to build his reputation, so an association with a spooky curse was better than nothing (not surprisingly, the producer declined to clarify things for this article). Draizin took his story to the mainstream on *Hollywood Ghost Stories*, a 1998 AMC TV special hosted by William Shatner. Shatner described the screenplay as "a screenplay that's to die for" before relating a legend claiming that John Belushi was considering the project during his final days. Yet Bob Woodward's *Wired: The Fast Times and Short Life of John Belushi*, which details the actor's last days in labored detail, makes no mention of the project. At the time of his death, Belushi was hellbent on pushing a romantic comedy called *Noble Rot*, even as studio honchos wanted him to take the low road and do a comedy called *Joy of Sex*. *Atuk* doesn't appear to have been a serious contender for the actor's attention, if indeed he even read it.

Similarly, an unfilmed adaptation of John Kennedy Toole's *A Confederacy of Dunces* is the subject of occasional arcane speculation due to the deaths of actors who were at one time connected with it, however briefly. Once again, John Belushi is the original victim of this curse, followed by the likes of John Candy, Divine, and yes, Chris Farley (Lippman 1999). At least in this case, Belushi's involvement was confirmed by manager Bernie Brillstein, whereas I can find no concrete evidence the actor was ever considering *Atuk* or that there was ever serious interest in the project until the script was presented to Kinison.

Maidee Walker, a writer who was shopping the script around town, later admitted, "I interviewed every fat actor in Hollywood" for the role. The problem with this curse story is that the script has also attracted a number of actors who are still with us, such as Will Ferrell, Jack Black, John Goodman, and Josh Mostel, as well as one comic, Jonathan Winters, who lived to a ripe old age. Also there is the rather obvious point that the actors who died early lived rather unhealthy lifestyles.

We all like to attach special significance to the events in our lives to make our lives appear unique. We like to see ourselves as worthy of attracting preternatural attention, rather than merely being victims of harmless pranks, theft, or our own forgetfulness. This is true even of famous actors with disappearing scripts. The human tendency is to find significance of some kind, religious or occult, to things that would otherwise be written off as mundane or coincidental.

This is true of anyone: famous actors, less famous crew members, on down to journalists and anonymous fans. If such stories can provide good publicity for a movie franchise, so much the better. As long as a curse or similar mysterious story provides an element of the eerie and keeps interest in a movie series alive, these stories will live on in the public imagination. ■

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Brett Taylor is a writer whose work has appeared in film and literary journals such as *The South Carolina Review* and *Filmfax*.

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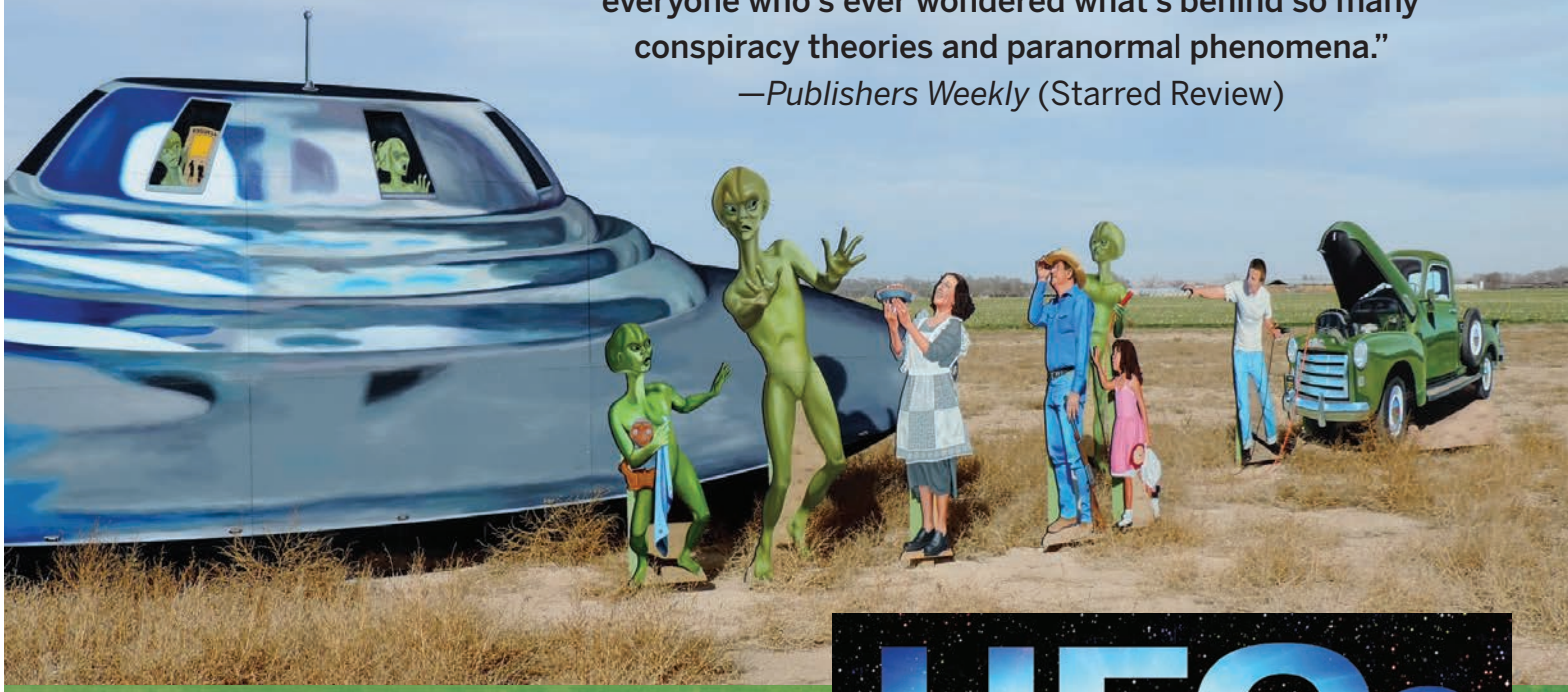

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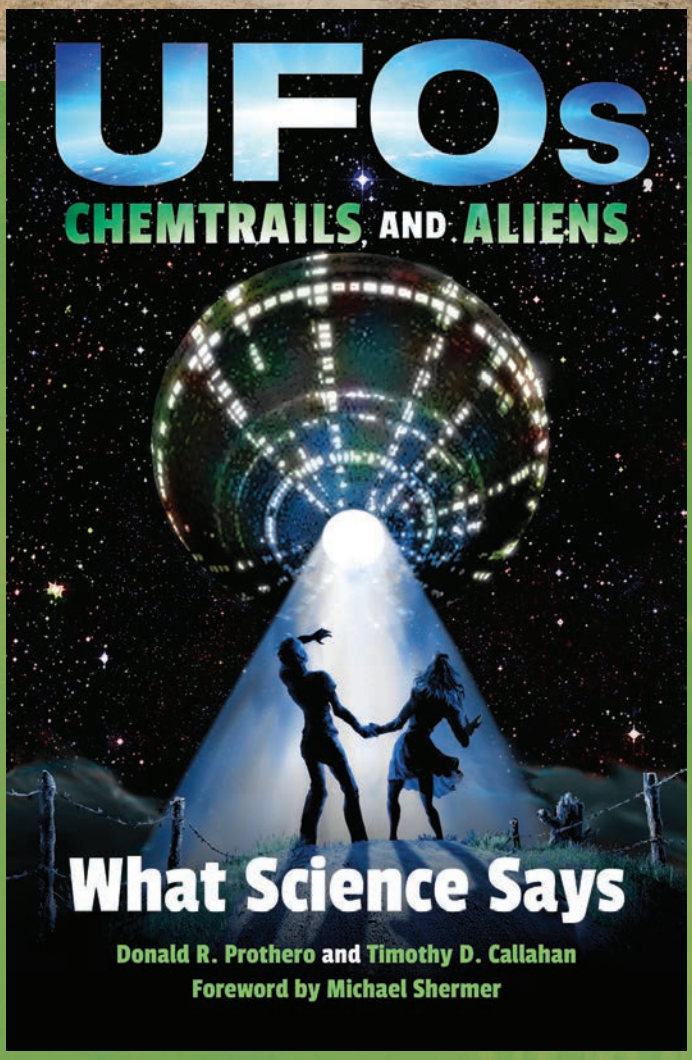

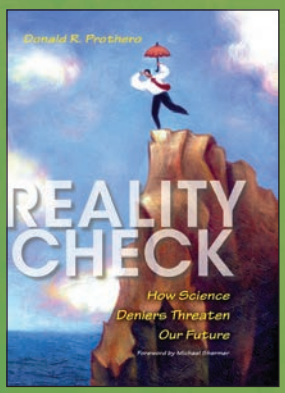

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Before Carl Sagan and Neil deGrasse Tyson, There Was Dan Q. Posin

Pioneer physicist and science popularizer Dan Q. Posin saw the power of television for education and inspiration. Almost lost to history, his story has new relevance today.

STUART VYSE

I am a product of that Cold War era. In the late 1950s, I was a young boy living in a suburb of Chicago. At school I practiced civil defense duck-and-cover drills in preparation for a nuclear attack, and at home I learned to use a soldering iron so that I could assemble a Heathkit shortwave radio. I taped newspaper clippings about satellites and rockets to the wall above my bed, and my parents bought me a home planetarium that projected the constellations onto the ceiling of my room.

I also became a devoted fan of a DePaul University physics professor, Dan Q. Posin. Perched in front of our tiny black-and-white television, I watched this elfin mustachioed man prance around a barren television studio, telling fascinating stories about atoms, comets, galaxies, and space travel. Long before the era of computer graphics, Posin used his considerable skills as a sketch artist to illustrate his programs, and he made effective use of props and posters. His daughter Kathryn accurately described his manner as a cross between Groucho Marx and Albert Einstein, and he was frequently accompanied on set by his cat Minerva, named after the Roman goddess of wisdom. Posin was the writer and star of several educational television series, including *Out of This World*, *The Universe Around Us*, and *Dr. Posin's Giants*, and his shows aired both nationally on the CBS television network and locally on WTTW, the Chicago public television affiliate. He wrote popular books to accompany his television shows, and I owned several of them. I still do.

Long before Carl Sagan, Neil deGrasse Tyson, or Brian Cox, Dan Q. Posin was a very energetic popularizer of science who saw the power of television for education and inspiration. He played an important role in developing my interest in science, and he was a beloved figure for many other people my age. Back then, *Watch Mr. Wizard* was also on the air, and I have some memories of that show. But it was Posin's programs and books that fueled my curiosity about space and science.

Sadly, Posin's story is largely lost to history, and it was not until many years later, when I began to research his life, that I discovered Posin was much more than the happy science teacher I saw on the screen.

Difficult Beginnings

Daniel Posin was born in 1909 in Russian Turkestan on the Caspian Sea, and in 1914 his parents fled in advance of the Russian Revolution. Unlike other areas of the Russian Empire, Jews of western Turkestan were allowed to own property and live relatively comfortably, but with the coming of the revolution, the future must have looked uncertain. As a result, the Posin family undertook a harrowing three-year trip across Asia, finally arriving in San Francisco in the bottom of a cattle ship. Having a knack for languages, Daniel quickly learned English and began to excel in school. He won a scholarship to the University of California at Berkeley, where he graduated Phi Beta Kappa and went on to get a PhD in physics in 1935. By then, his father, who worked as a janitor, had died of tuberculosis, and Posin had stolen the heart of Frances "Patsy" Schweitzer, a graduate student in English who was dating a friend at the time. Daniel and Patsy's marriage would last sixty-eight years until her death in 2002.

After graduation, Posin worked as a teaching assistant at Berkeley for two years, and then—after teaching himself Spanish in just two weeks—he accepted a position at the University of Panama, where he taught physics and wrote

textbooks in Spanish.[1] From there he had short teaching assignments at Montana State University and the Montana School of Mining. By then it was 1944 and World War II was well underway. As a result, Daniel, Patsy, and their two children went off to Massachusetts where Posin took a research position at the Massachusetts Institute of Technology doing research on radar systems.

North Dakota: A Beginning and an Ending

After MIT, Posin took his first substantial teaching position at North Dakota Agricultural College (NDAC) (now North Dakota State University), where he would stay for nine years. While he was at NDAC, two important events happened: he started his television career, and he got fired.

Posin's broadcast debut came on June 1, 1953, when he appeared as Fargo, North Dakota's, first television weather forecaster, "Dr. Dan the Weather Man." The studio of WDAY-TV was built in a converted two-car garage, and when mice got into the transmitter, the station manager got a cat. In a move he would repeat on subsequent television shows, Posin tucked the cat under his coat so the two could appear together during the weather segment. His live broadcasts were done in front of a chalkboard weather map, and WDAY-TV colleagues remembered the popular weatherman's humorous and dramatic on-camera style.

At NDAC, Posin was professor and chair of the physics department, and, for many years, all was well. But in 1954, the president of the college, Fredric Hultz, unilaterally eliminated the geology department, setting off a chain of events that would become the state's biggest news story. Posin was one of four professors who criticized President Hultz's actions, arguing that the president had violated tenure and that the termination had come too late in the academic year for the dismissed geology professors to obtain other employment. In response, Hultz turned on the four outspoken professors, criticizing some of the articles they had published, which the professors pointed out was a violation of their academic freedom. The conflict grew, and at a particularly emotional meeting, Hultz rose and read a long prepared statement—later referred to as the "The Blast"—which stunned the assembled faculty members. When the president had finished speaking, Posin rose and said, "Did you call me vicious?" To which Hultz replied, "You got ears."

The controversy came to the attention of the State Board of Higher Education in late 1954, and early the next year the Board requested the immediate resignation of the four professors. Posin and the others refused to resign, and, soon after, President Hultz declared the four had "engaged in a course of conduct deliberately intended to interfere with, undermine, frustrate, and render ineffective the administration of the Agricultural College." The professors were dismissed, subject to public hearings conducted in May of 1955. In the end, the State Board of Higher Education voted five-to-two to fire the professors. The four appealed to the State Supreme Court, but the court did not take up the case.

I found no evidence that Posin ever spoke publicly about the NDAC controversy, but it must have been a very difficult experience. This episode occurred during a tense Cold War period, just after the peak of McCarthyism. A year earlier, thirty-six days of the Army-McCarthy hearings had been broadcast live on national television with an estimated eighty million people watching. During those hearings, Senator Joseph McCarthy made the following statement:

> The thing the American people can do is to be vigilant day and night to make sure they don't have communists teaching the sons and daughters of America. Now, I realize that the minute anyone tries to get a communist out of a college, out of a university, there will be raised the phony cry that you're interfering with academic freedom. I would like to emphasize that there is no academic freedom where a communist is concerned.

President Hultz took advantage of the nation's anti-communist fervor in his attacks on the four dissenting professors. He pointed out that two of the men were Canadians who had not applied for U.S. citizenship, and he singled out Posin in particular, suggesting he was a subversive due to his Russian heritage. The president insinuated that the professors were anti-American, and an anonymous telephone campaign spread the message to "Get rid of the four communist professors at NDAC."

I Have Been to the Village

Daniel Posin was not a communist, but, as the episode in North Dakota suggests, he was a humanitarian and a man who was not afraid to speak up when he witnessed injustice. In August of 1945, while Posin was working as a researcher at MIT, the United States dropped atomic bombs on the Japanese cities of Hiroshima and Nagasaki, and like many nuclear physicists of his era, Posin felt a special sense of responsibility about the uses of atomic power. During the following summer, Albert Einstein wrote an appeal to scientists in the *New York Times Sunday Magazine*. Posin was particularly struck by this passage:

> Our representatives in New York, in Paris, or in Moscow depend ultimately on decisions made in the village square.
>
> To the village square we must carry the facts of atomic energy. From the village square must come America's voice.[2]

Einstein felt an especially strong moral obligation with respect to the bomb. His scientific work many years earlier had foreshadowed the prospect of enormous atomic power, and his actions led directly to America's construction of an atomic bomb. In August of 1939, Einstein wrote a letter warning President Franklin Roosevelt that recent scientific advances had raised the possibility of using uranium to create a new, devastatingly powerful weapon. Knowing that Nazi Germany was engaged in uranium research, Einstein urged Roosevelt to support an expanded atomic research program in the United States. Roosevelt was moved by the letter, which ultimately led to the Manhattan Project and the creation of an atomic weapon. Later, when it became clear that the German program had failed, Einstein felt a sense of regret about writing to Roosevelt—regret that was greatly amplified when the United States dropped two nuclear devices on Japan. He was a life-long pacifist, and he

felt his only justification for writing Roosevelt had been the fear that Germany would be successful in building an atomic weapon. As a result, following the war, Einstein helped form the Emergency Committee of Atomic Scientists (ECAS), whose goal was the containment of nuclear power through a system of world government.

By the time he read the passage above, Posin had arrived at North Dakota Agricultural College, and he realized there was an important role he could play. He was in complete agreement with Einstein and the goals of the ECAS, and as a talented science communicator, he was in an excellent position to take the message of peace to the village square.

The Posin family arrived in Chicago in 1956, and by February of 1958, he was a local celebrity.

Starting in October of 1946, Posin went out on the road. He developed a speech on the two uses of atomic energy: peaceful and destructive. The life of Marie Curie, whose discoveries led to the development of life-saving medical treatments, was an important part of the peaceful side of the story, but he also covered the destructive power of the atom bomb and the dangers of radiation poisoning. Like Einstein, Posin argued that a system of world government ("a supra-national political organization") was necessary to contain nuclear weapons and ensure peace. He ended his talks with an appeal for donations to the ECAS.

Between 1946 and 1948, Posin gave his "atomic talk" two hundred times throughout the country. He spoke in community halls, at parent teacher association meetings, and in public parks. After hearing him speak, people of very modest means contributed money, which Posin sent off to the ECAS. His audiences encouraged him to give the talk as often as possible, and people volunteered to organize repeat performances. Posin described his experiences in his 1948 book, *I Have Been to the Village*, for which Einstein wrote an introduction:

> Dr. D. Q. Posin's book bears eloquent witness to the sincere and self-sacrificing way in which the best among the scientists try to fulfill their duty towards the community. This sense of duty is simply due to the fact that, as a result of their profession, scientists are acutely conscious of the perilous position in which all of mankind has been placed by the new means of mass-destruction.

In his attack on the dissenting professors, NDAC president Fredric Hultz urged Posin to stop giving his talks, suggesting that they were anti-American. Once again, Posin ignored Hultz. Ultimately, Posin would give his atomic energy talk over three thousand times between 1946 and 1995. He spoke to groups throughout the United States, as well as in Canada, England, and France.

Success in Chicago

After his dismissal in North Dakota, Posin was hired as a professor of physics at DePaul University in Chicago, a post he would hold for eleven years. It was in Chicago that he achieved his greatest success as a public intellectual and educator.

The Posin family arrived in Chicago in 1956, and by February of 1958, he was a local celebrity with a profile in *Newsweek* magazine and his face plastered on the sides of Chicago Transit Authority buses. An April 1958 article in the Chicago *Sun-Times* newspaper identified Posin's show *The Universe Around Us* as an important ingredient in the financial success of WTTW, the local public television station. One of the many fan letters he received was from a ten-year-old girl who had saved a dollar from her quarter-a-week allowance to send to Posin: "I hope this will help keep your program on the air." While in Chicago, Posin would win six Emmy awards for educational programming.

In addition to teaching at DePaul and starring on television, Posin ran a lecture series for high school and junior high school students at Chicago's popular Museum of Science and Industry and held training sessions for teachers of high school science. He wrote articles for local and national newspapers and magazines, and he pioneered distance education by teaching an early televised course at DePaul. Also, during the Chicago years, Posin wrote several of his best-known science books, including *Dr. Posin's Giants* and *Life Beyond Our Planet*. It is hard to imagine how he did all this and still held down a job and maintained his family life, but somehow he did.

Back to California

By 1967, both Posin's son, Dan Q. Posin Jr., and his daughter, Kathryn, were grown, and he took a position in the physics department at San Francisco State University. For Posin this was a return to his beginnings as a young boy in San Francisco and a college student at UC Berkeley. It was also the place where he and Patsy met.

In 1968, Posin worked with KQED television making a series of half-hour television programs called *Science in the Age of Space* that were designed to augment the sixth-grade science program in the California schools. In 1970, he achieved a breakthrough when he produced a series of five programs broadcast for the first time in color over the National Educational Television network. The topic of the programs was the possibility of life in other solar systems, and they featured performances by his daughter, Kathryn, who was by then a professional modern dancer. Kathryn's role on the show was described as "illustrating space events and findings."

In California, Posin's life would once again bump up against the tide of history, as he returned to humanitarian causes. By coincidence, Posin arrived in San Francisco during the Summer of Love. It was the height of sixties countercul-

ture revolution, and pictures of the physics professor from that era show a man—still sporting his trademark mustache—but now framed by a longer salt-and-pepper pageboy cut. He continued to give his talks on atomic energy for another thirty years, and in March of 1969 he organized a "Day of Concern" at San Francisco State University (SFSU) to express "care over national policy of using scientific knowledge in weaponry and space projects." In 1973, as the Vietnam War dragged on, Posin founded "Professors for Peace," a group aimed at ending the war in southeast Asia and war in general. "If there is definitely injustice, wars are sometimes necessary," he said in a newspaper interview. "But we still have to work towards building non-violent alternatives."

Finally, he brought his two primary causes together in a popular course at SFSU called "Science and Human Values." In 1974, the class organized an effort to send 250 boxes of food and clothing to the victims of a hurricane in Honduras. I found this online comment from a former student:

> Dr. Posin was one of my professors at San Francisco State University. I still read his books, 30 years later, and have very vivid images of him lecturing. As a graduate student I got to build some of the RF and electronic devices that were utilized by other students performing research under Dr. Posin in many diverse areas, from plant biology to magnetocardiography. Then it all came together in his class "Science and Human Values." What an amazing man! I feel fortunate to have known him.

Posin would not retire from teaching until 1996, at which point he was eighty-seven. While at SFSU, he won the James T. Grady Award of the American Chemical Society for "interpreting chemistry for the public" and was nominated for the Nobel Peace Prize six times.

After Posin retired from SFSU, he and Patsy moved to a house next door to their son and his family in New Orleans. By that time, Dan Jr. was a law professor at Tulane University and the father of three. In a profile of Dan Sr. that appeared in the New Orleans *Times-Picayune* he said, "We're here because it's about time we got to know our grandchildren."

Patsy was raised as a Methodist, but as an adult she adopted the Bahá'í faith. Posin had always been resolutely nonreligious. Kathryn remembered having no religious background at all and going to a synagogue for the first time when a friend dragged her to one when she was a teenager in Chicago. At the end of his life, Posin began to show the signs of a late-onset dementia, and Kathryn said her father became more open to his wife's faith saying, "I want to go where she's going."

Patsy would die in 2002, and Daniel Q. Posin died less than a year later at the age of ninety-three.

Meeting Einstein

When I began to research Posin's life, I looked for his children and learned that Dan Q. Posin Jr. had died in 2006 but that Kathryn Posin was still alive and still dancing. Kathryn is a choreographer and director of Kathryn Posin Dance, a well-known company in New York. She also teaches dance and choreography at New York University. A few years ago, I spent a very enjoyable afternoon in her NoHo studio, which is in the same building where the artist Chuck Close has his studio.

Kathryn was effusive about her father. She referred to him as "Papa," and she was obviously pleased that I was taking interest in his career. She kept his Emmy awards on display and had held on to old tapes of his programs and other memorabilia. She said he was a wonderful parent—as was her mother—and he had been very proud of her as a dancer. She had many fond memories of appearing on his television programs.

Kathryn told me a story about the Posin family driving from Fargo, North Dakota, to Princeton, New Jersey, to meet Albert Einstein. Over the years, Einstein and Posin would become friends, united by their work for peace and against nuclear war, but this was their first face-to-face meeting. The eminent scientist had written an introduction to Posin's book, and the Posins traveled east to thank him in person. When they finally arrived, Einstein was sailing with his daughter, and the Posins waited outside for him to return. Kathryn was just six years old, and this was the first time she had ever seen her father nervous.

Recently Kathryn had been practicing dance in the basement of the Posin's home in Fargo, where her father stored a number of extra copies of his book on the Russian chemist Dmitri Mendeleev, the inventor of the periodic table of elements. A picture of the rather hairy-looking Mendeleev appeared on the cover of the book, and when the bushy-headed Einstein finally appeared, Kathryn ran toward him with arms outstretched shouting, "Mendeleev! Mendeleev!"

Kathryn remembered that Einstein laughed graciously at her mistake, but somehow she became aware that she had embarrassed her father, prompting her to run away and hide under a nearby car. She still remembered the smell of gasoline. Eventually the group recovered from this dramatic start, and they had a very pleasant visit.

I would love to know what the two men talked about on that day. They were both scientists but with very different talents. Two immigrants to the United States from different parts of the world, both with lives that were touched by history. But two men who, nonetheless, shared very similar goals. As much as Posin might have been in awe of Einstein, I like to think that Einstein, in his own way, might have been equally admiring of Posin. ■

Notes

1. Posin donated the royalties from his Spanish textbooks to a scholarship program at the University of Panama.

2. This article was evidently reprinted in a pamphlet that was sent out to many scientists. Posin reported reading this passage in the pamphlet rather than the *New York Times* article.

Stuart Vyse is a psychologist and author of *Believing in Magic: The Psychology of Superstition*, which won the William James Book Award of the American Psychological Association. He is also author of *Going Broke: Why Americans Can't Hold on to Their Money*. As an expert on irrational behavior, he is frequently quoted in the press and has made appearances on CNN International, the PBS NewsHour, and NPR's Science Friday. He is a fellow of the Committee for Skeptical Inquiry. He can be found on Twitter @stuartvyse.

Truth to Power on Climate

KENDRICK FRAZIER

Inconvenient Sequel: Truth to Power. *Starring* Al Gore. John Shenk and Bonni Cohen, directors. Documentary. Actual Films/Participant Media, 2017. 1 hour 40 minutes.

Eleven years after his much-discussed documentary on climate change, *An Inconvenient Truth*, Al Gore returns with his follow-up, *Inconvenient Sequel*, released in theaters nationwide this past August.

In this film, Gore devotes less time to educating us all on the science that demonstrates the reality of a warming world, on the valid assumption, I'd think, that anyone who cares about the evidence clearly knows that already. There *are* some good summaries of the scientific evidence, but *Sequel* 's emphasis is on the *effects* of global warming, already happening around the world, and the politics, diplomacy, and moral power of efforts to mitigate it.

Right-wing critics of climate science have always gone into a frenzy at any mention of Al Gore, trying their best to vilify him and his work. And they are attempting to do the same with this film. But make no mistake about it: Gore was perhaps the most scientifically informed vice president in U.S. history. His interest in and knowledge of climate issues is legitimate and serious and goes back four decades. He does his research. He respects science.

In *An Inconvenient Truth*, Gore worked closely with leading climate scientists, and it was firmly anchored in the science. Beyond that, Gore found powerful ways to illustrate both the latest scientific data and the effects. *Sequel* does so as well, returning to the Greenland ice cap to show us rushing rivers of meltwater plunging into huge holes in the ice where it descends to lubricate the ice's flow to the coast. Time-lapse images show vast realms of the ice crumbling before our eyes. A research station is shown resting on the ice cap surface a year earlier; now the ice beneath it has disappeared to such an extent that the station stands high in the air on its foundational stilts. Where is all that meltwater going? A quick segue to Miami Beach, its ocean-side streets flooding under high tides. Coastal cities such as Miami are at great risk (in Miami Beach efforts are underway, at considerable cost, to raise that thoroughfare just one foot higher, a stopgap measure at best), and populous third world cities that can least afford to protect themselves are next most at risk.

Sequel's emphasis is on the _effects_ of global warming, already happening around the world, and the politics, diplomacy, and moral power of efforts to mitigate it.

On a 120-plus-degree day in India, a woman's sandals stick to the melting asphalt, and she falls. As was long ago predicted scientifically, a warming world leads to more frequent and much more intense heatwaves, storms, and rainfall, and, in dry areas, more severe droughts. *Sequel* 's dramatic footage of the devastation from a powerful typhoon in the Philippines, and other recent natural disasters, is evocative. Syria's current civil strife was preceded by its worst drought in 900 years—another sign of how climate change affects world history.

The film is built partially around Gore's talks before groups of hundreds of climate science trainees he has helped organize all over the world. Some of these are already leaders in climate mitigation efforts.

Gore's experience in climate diplomacy is shown in the film in his determined effort before the 2015 Paris climate accords to get India to change its plans to build hundreds of coal-fired power plants. Gore learns that the obstacle India faces in going more solar is financial. He works to arrange access to both World Bank credit and to America's latest high-tech solar technology at

affordable costs; this is where a skilled politician can get things done in ways that scientists can only imagine.

The film is not perfect. There's a lot of Al Gore talking, and, for my taste, not enough of scientists. Yet it is effective in showing—sometimes in a visceral way—what is already happening as the world warms.

Gore works very hard to not have this movie be a downer. The United States may now be an outlier, a politically backward nation in our current government's stubborn resistance to science and to climate change. But the rest of the world is going ahead without us. He is exuberant in the film showing vividly how Chile is undergoing exponential growth in installed solar capacity. He lists countries that have, at least for periods of days, gone 100 percent alternative energy. Even some scattered cities in the United States have done so.

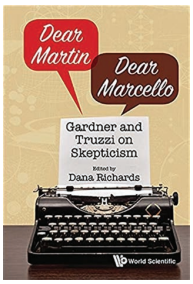
In one powerful scene near the end of the film, Gore goes to meet with the mayor of Georgetown, Texas, in, as the mayor says, "the reddest county in the reddest state" in the country. The mayor himself says he is a conservative Republican. Yet he has proudly led his town headlong to 100 percent use of alternative energy, using wind and solar to supplant fossil fuels. The mayor says it is a responsibility he feels—that we should all feel—toward future generations. Wow!

Gore himself breaks out of his normally measured demeanor at times to passionately argue for doing what is right. When our grandkids look back at us, will they ask: What in the world were you thinking? Didn't you see what the scientists were telling us? Didn't you see what nature was telling us? In that sense, we see that climate change transcends all borders, all politics, all economics, and even science. It is, in fact, a moral issue.

Kendrick Frazier is editor of the SKEPTICAL INQUIRER. A science journalist and former editor of *Science News*, he has followed climate science for four decades.

The Martin Gardner Correspondence with Marcello Truzzi

RAY WARD



Dear Martin, Dear Marcello: Gardner and Truzzi on Skepticism. Edited by Dana Richards. World Scientific, Singapore, 2017. ISBNs: 9789813203693 hardcover, 9789813203709 softcover. 458pp. Hardcover, $88; softcover, $48.

Martin Gardner (1914–2010) was a famous writer and philosopher of science, and Marcello Truzzi (1935–2004) was trained in sociology. Both had backgrounds in magic, giving them intimate knowledge of how people can be tricked and believe things unsupported by evidence. Both were founders of the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP) in 1976, but Truzzi soon left and founded his own journal, *The Zetetic Scholar* (not to be confused with *The Zetetic*, which became the SKEPTICAL INQUIRER). Much of their correspondence, collected and published for the first time in *Dear Martin, Dear Marcello*, is about Gardner's disapproval of what Truzzi published, which he thought conferred too much respectability to nonsense, while Truzzi criticized what he saw as CSICOP's debunking stance, which he considered to be in breach of its declared position of not dismissing anything without full evaluation.

As editor Dana Richards sums up neatly in his introduction, Truzzi contended that Gardner and CSICOP acted like lawyers, more interested in winning a case than abiding by science's rules of conduct. But, as he also says, CSICOP was never intended to be a scientific organization, performing experiments or carrying out field studies; as Gardner himself says in one of his letters, it had no lab. Gardner also opposed "believers" in the paranormal becoming CSICOP members (as opposed to subscribers). He specifically mentions Harold Puthoff, of whom the introduction nicely says that he and Russell Targ imagined they could do research in parapsychology but instead dealt with "psychics" who were cleverer than they were.

The book has four sections of greatly varying length: "The Road to CSICOP," "The Demarcation Problem" (by far the longest), "The Dissolution," and "Return to Cordiality."

All the early letters are from Gardner, Truzzi's having apparently not been preserved. There is much about Uri Geller (and professional magicians' astonishment at the obviousness and crudity of some of his tricks), proposals for the body that became CSICOP, and reputable publishers making a big thing of their integrity when dealing with other subjects but bringing out the most appalling rubbish on the paranormal. Gardner withdrew a book from the now-defunct Crowell-Collier Publishing Company because they published John G. Fuller's *Arigo*, about the Brazilian "psychic surgeon," while Andrija Puharich's dreadful book *Uri*, saying Geller was controlled from an alien spacecraft, was actually published by no less prestigious a firm than Doubleday.

One of Gardner's themes is that proposed explanations for "paranormal" phenomena are often ridiculously complicated when they are in fact very simple.

One of Gardner's themes is that proposed explanations for "paranormal" phenomena are often ridiculously complicated when they are in fact very simple—for example, the idea that Geller surreptitiously applied some chemical for his cutlery-bending. Ted Serios (who claimed to project thought images onto film) and Jule Eisenbud (who fell for his tricks and wrote a whole book about him) are also discussed, with Gardner making an interesting comparison with Arthur Conan Doyle and the Cottingley fairies: both intelligent men taken in by rather crude deception, and both absolutely unable to alter their opinion in the face of mountainous evidence.

Gardner is vehement about both neo-astrologer Michel Gauquelin and Immanuel Velikovsky, to whom Truzzi was more sympathetic. Gardner makes the good point that taking Gauquelin seriously meant his work would be trumpeted as evidence for astrology, when in fact Gauquelin was unequivocal that it provided no evidence whatsoever for traditional astrology. Other points Gardner makes that have become familiar in the skeptical field are that scientists are bad at testing paranormal claims (one proudly spoke of "20 years experience of designing electronic instruments"—to which Gardner's comment was: "as though that qualified [him] for psi testing!"); that the presence of a skeptical mind is conveniently claimed to inhibit paranormal powers; and that even when claimants' cheating is proved beyond all doubt it doesn't mean they *always* cheat: the mystic influence comes and goes in an unpredictable manner, it can't be turned on and off like a tap, and maybe they don't want to disappoint people. Gardner gives an example of the appalling dangers of belief in the paranormal: a girl in need of an operation who wanted to fly to the Philippines and have it done by "psychic surgeons" there.

Truzzi, however, is similarly critical (sometimes very strongly so) of philosopher and CSICOP cofounder Paul Kurtz ("a devious scoundrel") and Philip Klass (both of whom I had the pleasure of meeting and found very pleasant). He does, however, make the apposite comment that "The problem with most psi investigators ([John] Taylor is the best example) is that they are so arrogant that they believe they are too smart to be fooled." He mentions investigators who are so certain they cannot be deceived that they say people faking psychic powers do in fact have such powers and are lying when they deny it, referring to the famous case of Arthur Conan Doyle insisting that Houdini had such powers. I was reminded of those who similarly said that Mike Edwards and Steve Shaw, the perpetrators of James Randi's Project Alpha who completely fooled the investigators at the McDonnell Laboratory, were also lying when they denied having paranormal powers!

There is much discussion of the definitions of *charlatan* and *crackpot*, and Truzzi mentions the sad case of the indubitably brilliant Linus Pauling's obsession with vitamin C.

A curious feature of the book is that postal addresses, phone numbers, etc., are replaced by "[[item] withheld]." The intention to protect privacy is no doubt admirable, but somewhat pointless in many cases—publishers whose addresses would be publicly available, for example, or Gardner's phone number—and it would save space if they were replaced by ". . ." or, like a great deal of other irrelevant matter, simply omitted.

At one point, Gardner and Truzzi apparently agreed to differ and stop arguing—but then continued! "We are hopelessly of different mindsets—let's stop trying to convert each other," said Gardner. And, "How you can admire a man who took Doyle's fairy photos seriously is beyond me." Things really did get hostile, Truzzi calling Gardner "intellectually dishonest" and saying he must conclude "the truth matters little" to him. Eventually Gardner bluntly asked Truzzi to stop writing to him; there were a few more contacts, a gap of about a year, then the correspondence resumed quite cordially.

Gardner comes off best. Truzzi was indubitably clever but guilty sometimes of what I call the "cart before the horse" approach: "We have a mystery; how can we solve it?" rather than "Is there really any mystery?" He suggested Gauquelin's "Mars effect" might have something to do with athletes' and their parents' body types and such people's frequency of sexual intercourse—an example of Gardner's point about over-compli-

cated explanations! As Gardner says, it is far more likely that his raw data were inaccurate.

The editing of this book is decidedly poor, with many oddities of punctuation, wording, and spelling, and it is not clear whether they are in the originals (in which case this should be indicated) or are transcription errors; the index is almost useless: there are only two references to Gauquelin (one misspelt "Gauguelin"), who is actually mentioned in hundreds of letters, two each to Klass, Carl Sagan, and Targ, and three each to Velikovsky, Geller, Puthoff, and Kurtz, all of whom are also in fact mentioned many times.

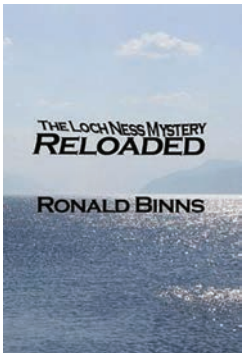
The book is a treasure-trove of apposite comments on many well-known people and claimed phenomena.

The book is a treasure-trove of apposite comments on many well-known people and claimed phenomena, and it is a pity that they will so often be untraceable because of the poor indexing. It is also brave to publish very blunt remarks about people such as Geller and von Däniken ("an outright charlatan") who are still alive. This is an indubitably valuable book, but its value could have been greatly enhanced by better editing and indexing.

Ray Ward is retired and lives in London after a career in library work. He has a BA in politics and a long-term interest in paranormal claims. He has reviewed books in the field for British skeptic publications.

Loch Ness Solved—Even More Fully!

JOE NICKELL



The Loch Ness Mystery Reloaded. By Ronald Binns. Zoilus Press, London, UK, 2017. ISBN 9781999735906. 222 pp. Paperback, £12.

With his new book, *The Loch Ness Mystery Reloaded*, Ronald Binns takes another bow as the man who cast the net and drew up from the depths the ultimate truth about the fabled creature, Nessie.

Binns is himself a distinctive creature: He began as a believer—once a member of the Loch Ness Phenomena Investigation Bureau—but evolved into the author of what I have called the definitive, skeptical book on the subject.

In that book, *The Loch Ness Mystery Solved* (1983), Binns did what no one had troubled to do in the previous half-century of monster history: He pored over the 1933 files of the *Inverness Courier* and illuminated the earliest sightings of that monster-inaugurating year. His search revealed not only "that there had always been a local skeptic counter narrative" but also that there had been no sightings for the previous half century. Moreover, one Alex Campbell had been responsible for virtually inventing the monster—the first to publicize it, continuously hype it, and, eventually, claim to have been an eyewitness on no fewer than eighteen occasions (Binns 2017, pp. 10–11, 36–37). But Binns was only getting started.

He does not consider *Reloaded* a sequel to *Solved*. Emphasizing that his "view of the monster has not changed since 1983" (p. vi), he has produced neither a rewrite nor a sequel. Instead, he has absorbed the new information that has come to light—for example, that the famous 1934 image of Nessie known as "the surgeon's photograph" was a hoax using a small model—and so has updated and added to the classic cases.

Of course he can say "I told you so" in the 1934 case since he had anticipated the solution—even having produced his own fake photo using a model of about the same size. "This turns out to have been an amazingly percipient piece of guesswork," writes Binns (66), but I think of it as real detective work by one with an excellent eye and judgment.

In *Reloaded*, Binns analyzes at length—and deconstructs—the classic Nessie sightings. In doing so, he frequently refers to what Rupert T. Gould (in his *The Loch Ness Monster and Others*, 1976, 112–113) called "expectant attention"—that is, the tendency of people to be misled by their own expectations. Binns insists (repeating it nearly verbatim later),

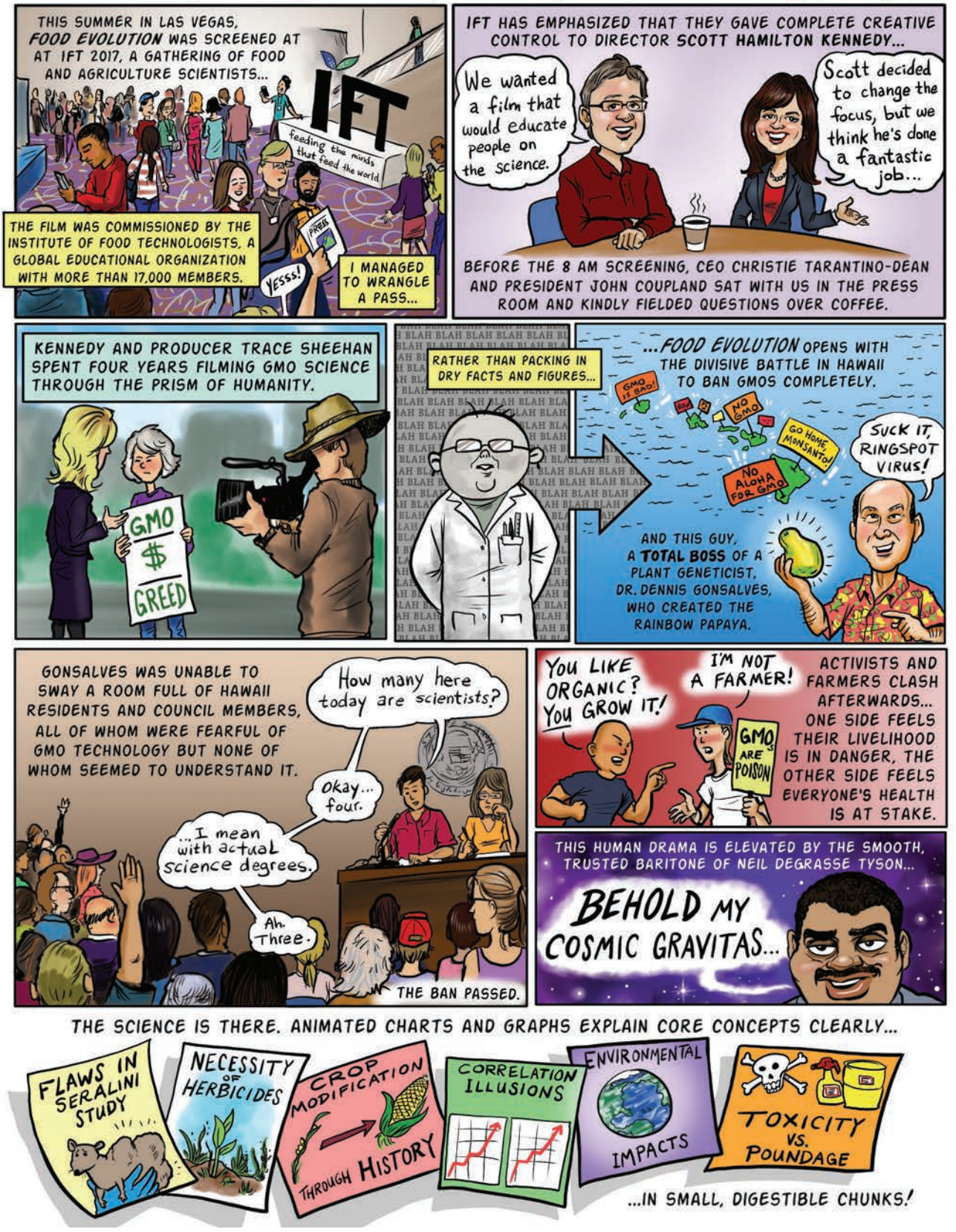
Continued on p.62

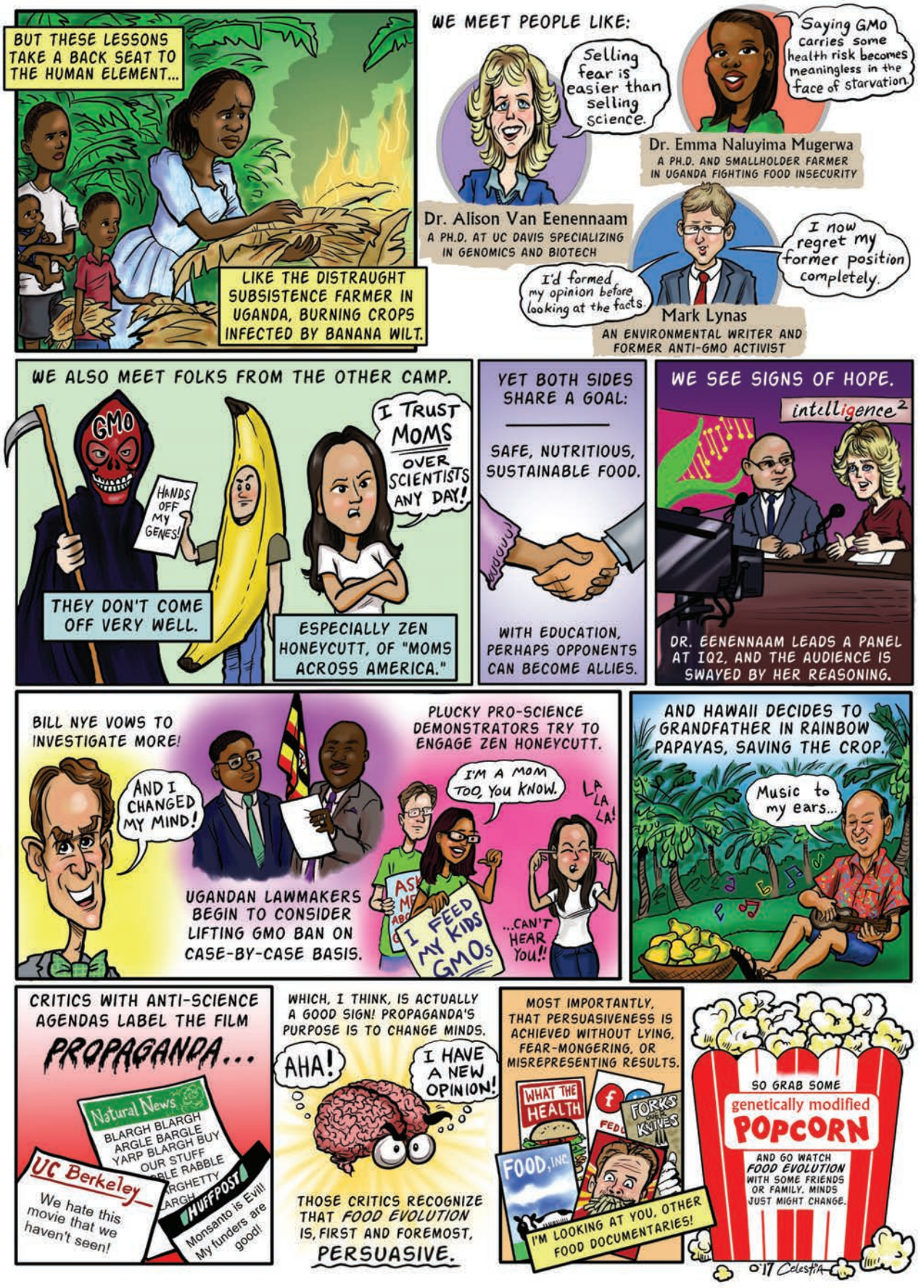
FOOD EVOLUTION

A PICTORIAL FILM REVIEW

Food Evolution is available on iTunes and can be streamed exclusively on Hulu. Check FoodEvolutionMovie.com to find remaining screenings or to set up a screening near you.

BY Celestia Ward


THIS SUMMER IN LAS VEGAS, FOOD EVOLUTION WAS SCREENED AT AT IFT 2017, A GATHERING OF FOOD AND AGRICULTURE SCIENTISTS...
IFT
feeding the minds that feed the world
PRESS
THE FILM WAS COMMISSIONED BY THE INSTITUTE OF FOOD TECHNOLOGISTS, A GLOBAL EDUCATIONAL ORGANIZATION WITH MORE THAN 17,000 MEMBERS.
YESSS!
I MANAGED TO WRANGLE A PASS...
IFT HAS EMPHASIZED THAT THEY GAVE COMPLETE CREATIVE CONTROL TO DIRECTOR SCOTT HAMILTON KENNEDY...
We wanted a film that would educate people on the science.
Scott decided to change the focus, but we think he's done a fantastic job...
BEFORE THE 8 AM SCREENING, CEO CHRISTIE TARANTINO-DEAN AND PRESIDENT JOHN COUPLAND SAT WITH US IN THE PRESS ROOM AND KINDLY FIELDED QUESTIONS OVER COFFEE.
KENNEDY AND PRODUCER TRACE SHEEHAN SPENT FOUR YEARS FILMING GMO SCIENCE THROUGH THE PRISM OF HUMANITY.
GMO $ GREED
RATHER THAN PACKING IN DRY FACTS AND FIGURES...
...FOOD EVOLUTION OPENS WITH THE DIVISIVE BATTLE IN HAWAII TO BAN GMOS COMPLETELY.
GMO IS BAD!
NO GMO
GO HOME MONSANTO!
NO ALOHA FOR GMO
SUCK IT, RINGSPOT VIRUS!
AND THIS GUY, A TOTAL BOSS OF A PLANT GENETICIST, DR. DENNIS GONSALVES, WHO CREATED THE RAINBOW PAPAYA.
GONSALVES WAS UNABLE TO SWAY A ROOM FULL OF HAWAII RESIDENTS AND COUNCIL MEMBERS, ALL OF WHOM WERE FEARFUL OF GMO TECHNOLOGY BUT NONE OF WHOM SEEMED TO UNDERSTAND IT.
How many here today are scientists?
Okay... four.
...I mean with actual science degrees.
Ah. Three.
THE BAN PASSED.
YOU LIKE ORGANIC? YOU GROW IT!
I'M NOT A FARMER!
GMOs ARE POISON
ACTIVISTS AND FARMERS CLASH AFTERWARDS... ONE SIDE FEELS THEIR LIVELIHOOD IS IN DANGER, THE OTHER SIDE FEELS EVERYONE'S HEALTH IS AT STAKE.
THIS HUMAN DRAMA IS ELEVATED BY THE SMOOTH, TRUSTED BARITONE OF NEIL DEGRASSE TYSON...
BEHOLD MY COSMIC GRAVITAS...
THE SCIENCE IS THERE. ANIMATED CHARTS AND GRAPHS EXPLAIN CORE CONCEPTS CLEARLY...
FLAWS IN SERALINI STUDY
NECESSITY OF HERBICIDES
CROP MODIFICATION THROUGH HISTORY
CORRELATION ILLUSIONS
ENVIRONMENTAL IMPACTS
TOXICITY VS. POUNDAGE
...IN SMALL, DIGESTIBLE CHUNKS!


BUT THESE LESSONS TAKE A BACK SEAT TO THE HUMAN ELEMENT...
LIKE THE DISTRAUGHT SUBSISTENCE FARMER IN UGANDA, BURNING CROPS INFECTED BY BANANA WILT.
WE MEET PEOPLE LIKE:
Selling fear is easier than selling science.
Dr. Alison Van Eenennaam
A PH.D. AT UC DAVIS SPECIALIZING IN GENOMICS AND BIOTECH
Saying GMO carries some health risk becomes meaningless in the face of starvation.
Dr. Emma Naluyima Mugerwa
A PH.D. AND SMALLHOLDER FARMER IN UGANDA FIGHTING FOOD INSECURITY
I'd formed my opinion before looking at the facts.
I now regret my former position completely.
Mark Lynas
AN ENVIRONMENTAL WRITER AND FORMER ANTI-GMO ACTIVIST
WE ALSO MEET FOLKS FROM THE OTHER CAMP.
GMO
HANDS OFF MY GENES!
I TRUST MOMS OVER SCIENTISTS ANY DAY!
THEY DON'T COME OFF VERY WELL.
ESPECIALLY ZEN HONEYCUTT, OF "MOMS ACROSS AMERICA."
YET BOTH SIDES SHARE A GOAL:
SAFE, NUTRITIOUS, SUSTAINABLE FOOD.
WITH EDUCATION, PERHAPS OPPONENTS CAN BECOME ALLIES.
WE SEE SIGNS OF HOPE.
intelligence²
DR. EENENNAAM LEADS A PANEL AT IQ2, AND THE AUDIENCE IS SWAYED BY HER REASONING.
BILL NYE VOWS TO INVESTIGATE MORE!
AND I CHANGED MY MIND!
UGANDAN LAWMAKERS BEGIN TO CONSIDER LIFTING GMO BAN ON CASE-BY-CASE BASIS.
PLUCKY PRO-SCIENCE DEMONSTRATORS TRY TO ENGAGE ZEN HONEYCUTT.
I'M A MOM TOO, YOU KNOW.
I FEED MY KIDS GMOs
LA LA LA!
...CAN'T HEAR YOU!
AND HAWAII DECIDES TO GRANDFATHER IN RAINBOW PAPAYAS, SAVING THE CROP.
Music to my ears...
CRITICS WITH ANTI-SCIENCE AGENDAS LABEL THE FILM
PROPAGANDA...
Natural News
BLARGH BLARGH ARGLE BARGLE YARP BLARGH BUY OUR STUFF
UC Berkeley
We hate this movie that we haven't seen!
HUFFPOST
Monsanto is Evil! My funders are good!
WHICH, I THINK, IS ACTUALLY A GOOD SIGN! PROPAGANDA'S PURPOSE IS TO CHANGE MINDS.
AHA!
I HAVE A NEW OPINION!
THOSE CRITICS RECOGNIZE THAT FOOD EVOLUTION IS, FIRST AND FOREMOST, PERSUASIVE.
MOST IMPORTANTLY, THAT PERSUASIVENESS IS ACHIEVED WITHOUT LYING, FEAR-MONGERING, OR MISREPRESENTING RESULTS.
WHAT THE HEALTH
FORKS OVER KNIVES
FOOD, INC
I'M LOOKING AT YOU, OTHER FOOD DOCUMENTARIES!
SO GRAB SOME genetically modified POPCORN AND GO WATCH FOOD EVOLUTION WITH SOME FRIENDS OR FAMILY. MINDS JUST MIGHT CHANGE.
©'17 CelestiA

Continued from p.59

that "the sincerity of eye-witnesses is very rarely in doubt" (28, 136) and that they are unshakeable in their conviction as to what they have seen—however mistaken that may be. For instance, he also wisely calls attention to the issue of brevity, stating, "It's questionable whether a momentary sighting really allows an objective assessment of size and shape" of something seen (126). Then there is "the problem of transmission: who is telling the story and how are they telling it?" (124–125). These are valuable observations from one who has investigated so many cases.

Left in Binns's wake (so to speak) is "not one phenomenon but a wide variety, especially boats' wakes, birds and otters" (13) as he had determined in 1983. In addition to a great variety of such phenomena there were also outright hoaxes—notably fauxtographic ones. That is not to say that the identification in every case is conclusive—far from it—but, invariably, competing hypotheses are all more credible than the notion of a large, hitherto unknown creature.

He not only looks at the individual sightings but at the entire Loch Ness phenomenon itself—which he regards not as a hoax (as some have done) but as a myth in the true sense of the term (202). With his 1983 book, he had realized how appropriate was the word *Solved*. Now he says (15):

> The story has continued but the songs remain the same. At heart the Loch Ness monster is a sociological, not a zoological phenomenon. Others have reiterated and refined my case against the monster, but the reality was that after 1983 the search for a Loch Ness Monster was finished. Continuing the great Nessie hunt was an exercise in futility. There is no species of large unknown animal in the Loch but the possibility that there just *might* be continues to enthrall a small number for whom eye-witness evidence outweighs all other considerations.

What Lawrence David Kusche did for the Bermuda Triangle in 1975, Ronald Binns did for the Loch Ness monster in 1983: He solved the "mystery." And with his thoroughgoing new book, *The Loch Ness Mystery Reloaded*, it stands even more fully solved. It is a myth out of water, left flopping on a beach of the imagining, gulping air. ■

Joe Nickell, PhD, is a skeptical cryptozoologist and author or coauthor of books on the subject. He has himself investigated at Loch Ness.

[LETTERS TO THE EDITOR

Fire-Breathing Dinosaurs?

I enjoyed Philip J. Senter's thorough explanation of why claims of fire-breathing dinosaurs are unrealistic (July/August 2017). The idea that such an article should be necessary seemed almost comical (akin to Skeptical Inquirer running a cover story on "Why Reindeer Can't Really Fly") until I read that claims about fire-breathing dinosaurs appear in some seventh-grade biology textbooks. The fact that home-schooled pupils should be using such textbooks is bad enough, but the idea that they are employed by any school in receipt of state funding ought to be a source of national shame. Of course it isn't hard to believe such propositions are held by the same people who claim Earth is 6,000 years old. As Richard Dawkins points out in *The God Delusion*, "To get an idea of the scale of this error, it is the equivalent to believing that the distance from New York to San Francisco is 7.8 yards."

I hope for their sake that the children learning about dragons in biology are getting their information on American geography from a very different source.

Martin Stubbs
London, UK

A thought on "Fire-Breathing Dinosaurs": Phillip J. Senter well demolished the idea of any kind of fire-breathing animal. But the legend of the beast spans several Eurasian cultures and seems to have been around for ages. There could have been some animal that, as perceived by primitive people, appeared to breathe fire or whose description over vast time has morphed into that image. This is especially imaginable if the legend began when people were not even sure what fire was.

Numerous members of different animal kingdoms produce a wide spectrum of dangerous chemicals, from snake and spider venom, toxic amphibian slime, and bee stings to skunk spray. One of my favorites is the green heron, a medium-sized primitive bird that has miraculously continued to exist, using regurgitation as a defense means. If a large mysterious creature in the misty past, possibly even a flying one, sprayed a burning, corrosive fluid upon prey or predators, perhaps even a red mist, that could be grounds for the present-day dragon legend.

This critter does not seem to be around these days, and fossils do not well preserve soft tissue, so if the evidence is obscured we may not find any signs of it. The adage that where there's smoke, there's fire is not always true but often is.

Joan MacNeill
Portland, Oregon

Philip Senter replies to MacNeill:

Where there's smoke, there is indeed fire. The drakon/draco *spat venom in several saint-versus-"dragon" stories from late antiquity, a period when the term* drakon/draco *still meant a wingless and legless serpent (as shown by classical iconography). By the early Middle Ages, venom-spitting had been replaced by fire-spitting in the stories. For specific examples, see Daniel Ogden's book* Dragons, Serpents, and Slayers in the Classical and Early Christian Worlds: A Sourcebook.

Before then, the only fire-spitting serpent was Leviathan from the biblical book of Job. Various other non-serpent entities produced fire in ancient myths (e.g., the anthropomorphic monster Humbaba of Mesopotamian mythology and the goat head of the Chimaera of Greek mythology), and a Babylonian cylinder seal depicts a quadruped with flames arising from its back.

But given that today's dragons can be traced back to the Greek and Roman drakon/draco, whereas the other fire-producing creatures are not part of that lineage, it stands to reason that the origin of fire-spit-

ting in the European dragon is due to the replacement of venom (which feels like it burns) with fire (which actually burns) in the early saint versus serpent stories. Just as you suspected, the inspiration for the fire-spitting was a real thing: snake venom.

The JonBenet Ramsey Murder Case

First, a general "well done" for an outstanding issue (July/August 2017). I found Nickell's "non-accusatory" hypothesis about the JonBenet Ramsey murder especially interesting, although sensationalized crime is not generally my cup of tea ("JonBenet Murder Mystery Solved? [Not by Psychics]").

Nickell says in the article that "Cyril Wecht calls attention to the little-discussed practice of auto-erotic asphyxiation [AEA]" and goes on to frame JonBenet's death as (essentially) an AEA episode gone bad. He mentions terms like the "choking game" and others used in the popular media. I recently completed the biography of pioneer criminologist Luke S. May (1892–1965). In 1948, May handled a case that looked—in my view—like a classic AEA "accidental suicide," where the choking game went too far. Talk about "little discussed"! The death was heavily covered in the press of the day, and then absolutely dropped from sight within a week after May joined the case with a call for an exhumation.

I believe Nickell makes an excellent case for his hypothesis. I am guided in that opinion by a reference I found during my research on the Luke May case. I offer it to readers who might want to learn more about the topic: Anny Sauvageau, Vernon J. Geberth, *Autoerotic Deaths: Practical Forensic and Investigative Perspectives*, CRC Press, Boca Raton, Florida (2013). Addendum: AEA deaths have been documented at least as far back as 1718.

Evan Filby
Idaho Falls, Idaho

I read with great interest Joe Nickell's article on the JonBenet case. I agree with most things he says but beg to differ on the killer. He only eliminates the parents because he cannot come up with a reason why the parents would lie for each other. I find it very simple to explain why they would. If Patsy caught John abusing JonBenet (the scream that was heard at 2 AM) and in trying to hit him over the head with a flashlight she hit JonBenet instead, they would have to lie for each other. Patsy could not be revealed as the killer nor John as the abuser.

The one mistake I detected in Mr. Nickell's article is his assumption that JonBenet was killed in the basement. The body was clearly moved. She was placed in her favorite blanket (that had been upstairs in the dryer near her room), showing the love the killer had for her. She also then had to be lifted downstairs and placed in the most obscure part of the house by a strong adult.

Brenda Bright
Hillsboro, Oregon

Joe Nickell's article on the death of JonBenet Ramsey left quite a bit to be desired. The major problem is that it took an awful lot of copy to repeat widely known and well-documented details of the case to arrive at a vague conclusion that amounted to: "I can't prove it, but the facts are not inconsistent with the theoretical solution I have proposed." Furthermore, the article barely touched upon the remit of SI. That the case attracted self-described psychics is neither surprising nor new. So what is the reason for publishing a piece that would seem to be a better fit for a true crime magazine? I might ask the same question about Mr. Nickell's admittedly interesting, highly readable piece on John Dillinger.

Matthew Cope
Westmount, Canada

In a recent hatchet job, author Joe Nickell used well-known logical fallacies as well as misrepresentation of facts to paint himself into a corner regarding the JonBenet Ramsey homicide case.

Nickell's dismissal of the DNA evidence contains the logical fallacies (using the vocabulary of Michael Shermer's book *Why People Believe Weird Things*) the "need for control, simplicity and certainty" as well as "overreliance on authorities" and the error of "representativeness."

Nickell misrepresents the existing wide-ranging, pseudoscientific handwriting analyses of the ransom note by citing only the credentials and extremist conclusions of Gideon Epstein to determine that the only viable murder suspects are John, Patsy, and Burke. Citing his unsupported belief that neither John nor Patsy killed their daughter, Nickell is left with Burke as the only suspect out of six billion, then extrapolates wildly to sibling sex play and accidental asphyxiation.

Nickell summarily and unfairly threw out the best evidence (DNA) and most likely scenario (sadistic pedophile), arriving at an extremely unlikely conclusion without ever looking back.

David Clark
Garland, Texas

I hate to say it, but frankly I am disgusted that your fine magazine would publish "JonBenet Case Solved?" The subject has nothing to do with the mission except for a passing mention of some goofy psychic.

It reviews the facts (which I regard as excellent), but mainly it is a terrible, unpardonable, couched-in-legalese accusation of murder against Burke Ramsey. I might be okay with this if the evidence were overwhelming but it isn't—not even close. It's pure, specious conjecture.

I've followed this terrible case for years and for a long time believed the parents were guilty or somehow culpable. However, their disgust in hard-hitting interviews at being accused and railroaded seemed genuine to me *finally*.

Burke Ramsey has had a nightmarish existence since his little sister was killed. *That alone was horrific and unforgettable*. In addition, who can imagine what it's been like to have the world's rapacious media after your family, not to forget the weight of the state? And then to be accused of being the murderer by a poorly reasoned, sensational "documentary" and Mr. Nickell's article is downright heinous.

It's no surprise when a tawdry, anything-for-a-buck network airs junk about him, but staid SKEPTICAL INQUIRER following suit is harder to believe than the latest alien abduction claim.

Aghast.

Ted Schaar
Brookfield, Wisconsin

Joe Nickell replies:

Good readers Evan Filby and Brenda Bright add to the discussion. I would remind the latter that I did not eliminate the parents solely on the question of why one would lie for a guilty other. If Patsy accidentally struck JonBenet and the child was not killed instantly and to a certainty—as the evidence indicates—Patsy would surely have called 911. Also I argued there is much stronger evidence against Burke as the killer. As to the basement, it was indicated forensically, and the added blanket does not suggest the body had been elsewhere. Interestingly (not mentioned in my article), Burke once angrily hit his sister in the head with a golf club.

Such facts help us judge Matthew Cope's assertion that I only repeated "widely known and well-documented details in the case." Not only is the devil in the details, but out of countless ones—some little known to the general public and others disputed or erroneous—I selected and assembled certain details to create what I believe is the most likely scenario. I did so using my experience in investigating homicides for police and others, together with the training, research, and experience I put into authoring forensic textbooks. If a reader will yet fail to understand, I fear he will never have a clue.

Sadly, David Clark flails at me with accusations of a "hatchet job" but wounds himself terribly. For example, although he accuses me of illogic, he commits what I call the you-didn't-agree-with-me fallacy, while being himself hopelessly given to confirmation bias. I happen to know he is linked to the notoriously pro-Ramsey "Jameson"—actually one Susan Bennett, a North Carolina housewife who (according to a Boulder newspaper) "had a vision while taking a shower two days after the murder that the

Ramseys were innocent." Without any background in law, forensics, or homicide investigation, she has wasted police time on bogus tips, says the newspaper, such as one that a former Ramsey employee's family "were part of a child pornography operation." Clark seems to accept "Jameson" uncritically, when he should instead fact-check her fact-checking. Contrary to him, it is not I but real experts who question the DNA as likely contamination.

While Ted Schaar finds my review of the facts "excellent" he still asserts the Ramseys were "railroaded." I believe I showed otherwise. I'm not worried about Burke (and I didn't determine "murder": see my article's final sentence). In 2016, at age twenty-nine, he appeared on Dr. Phil. Later that year he also filed lawsuits against CBS and a pathologist, asking a total of $900 million—an amount obviously intended to intimidate people. Let us only be concerned with seeking the truth and obtaining justice for JonBenet.

Finally, Cope and Schaar think crime science should be off limits to SI, but for years we have expanded beyond just the paranormal. In fact I began to combine the genres of true crime and paranormal claims in SI long ago. Juxtaposing them in the JonBenet case for comparison seemed to me—still seems—a good idea. Anyway, I appreciate the open-mindedness of our esteemed and longsuffering editor, Ken Frazier.

Humanities Teach Critical Thinking

I was pleased to see the Skeptical Inquirer cover a recent paper by Anne McLaughlin and Alicia McGill about critical thinking in the context of the humanities (News & Comment, July/August 2017, p. 11).

I would go a step beyond Kendrick Frazier's recommendation that "it is good for all of us to recognize that science courses aren't the only academic route to teaching critical thinking and resisting pseudoscientific ideas" and say that the humanities are and always have been the primary academic area where students receive explicit instruction in critical thinking. Indeed, most students are formally introduced to critical thinking in their first-year writing courses, which are run out of English, Rhetoric, or Communication Department writing programs. Freshman writing is, as far as I can tell, the only class that is universally required of college students anymore, and I think that there is a good reason. Every rhetoric and writing textbook I have ever used or seen introduces the basic elements and terminology of critical thinking, tools that allow students to isolate elements of arguments and draw conclusions about their likely validity.

Outside of writing programs, you are lucky to see critical thinking being taught explicitly outside of elective courses in philosophy. Even though from talking to skeptics you could be excused for thinking that everything you needed to know about the humanities flowed from the pen of Alan Sokal, the overwhelming amount of scholarship in the humanities depends on the application of reason to evidence, even in some areas that are more subjective, such as literary interpretation. You have to justify your arguments with good evidence that you handle responsibly.

McLaughlin and McGill's study is of special interest of skeptics because it measured pseudoscientific beliefs. Critical thinking is a complex, variously defined phenomenon, and it goes well beyond identifying extraordinary claims and demanding evidence for them. It encompasses awareness of biases and logical fallacies, an ability to imagine the motives of others, to assess expertise, and a host of other practices. How best to deliver (and measure) success in teaching this suite of skills remains elusive. I suspect that studying the humanities, however, is part of the answer.

Bob Blaskiewicz
Assistant Professor of Critical Thinking and First-Year Studies
Stockton University
Galloway, New Jersey

A note on methodology for those following up on the novel techniques for teaching critical thinking via the humanities:

I taught an advanced elective, "Parapsychology, a Critical Examination," which was a very popular course, routinely fully enrolled; it was also a very difficult one, which came as a surprise to many. On the first day, I would ask everyone to fill out a questionnaire about their attitudes and beliefs toward things paranormal (telepathy, astrology, cryptozoology, UFOs, prophetic dreams—the works). On the final day, they filled the questionnaire out once more. Invariably, there was a dramatic shift in attitudes and beliefs toward the skeptical side.

Then the fun part. I would ask them to fill out the questionnaire again, this time as they *recalled* themselves believing on Day 1. The results, semester after semester, were clear: they misremembered their earlier positions, thinking that they held more skeptical views than they actually did. It was as if they found it difficult to grasp how uncritical their earlier beliefs were and misremembered them.

I'd suggest something along these lines for assessing the impact of these novel methods for teaching critical thinking. While these data weren't part of a formal study, in retrospect I am sorry I never wrote them up for publication—the technique might prove generally useful.

Arthur S. Reber
Point Roberts, Washington

Tests of Astrology Book Missed on Gauquelin

I do not totally agree with Ivan Kelly's enthusiasm for *Tests of Astrology* (May/June 2017). This quite interesting book does not give a correct view concerning critical research about Michel Gauquelin's work. It denigrates skeptical organizations who tried to verify this work, such as the Belgian Comité Para, the former French group CFEPP, and even CSICOP (now CSI), who are called "the true disbelievers"(!).

Gauquelin discovered a nonexplained correlation of the positions of the planet Mars in the birth sky with birth-times of top categories of sport people. He claimed that there was no such effect with less eminent sport people. The question was which criterion he used to select eminency. A similar test made by CFEPP (published in 1996) showed remarkable differences in selection criteria between this test and Gauquelin's. The results were reviewed by the well-known Dutch skeptic (and CSI Fellow) Jan Willem Nienhuys. He concluded that Gauquelin's selection could have been influenced by his own conviction. The presence of a Mars effect seemed for him to be an argument to determine the "eminency" of champions. Moreover, Gauquelin seemed to have fewer doubts about the accuracy of birth data of a person when Mars was in the good position.

The authors of *Tests of Astrology* show their sympathy for Gauquelin, but that is not a good reason to trivialize objections coming from (true) skeptics.

Tim Trachet
Brussels, Belgium

Risks, Real and Imagined

In his review of the book *Getting Risk Right* (July/August 2017), Terence Hines's analysis of the Leslie et al. paper misses an important point. The probability that 41 or more out of 148 tests would have odds-ratios each of which is attainable with less than a 5 percent probability by chance is effectively zero. The important point is that 11 of the 41 control tests also have less than a 5 percent probability by chance. The probability for this is about 0.000004. This low probability strongly suggests that the members of the vaccinated and unvaccinated groups are not equivalent. No conclusions can be drawn about the effects of vaccination from this study.

Multiple comparison studies are useful for identifying risk factors for further study. They are not generally sufficient for proof of correlation, let alone cause.

The examples Hines pulls from Kabat's book suggest that Kabat has ignored context to disparage public perception of environmental risks. For example, Love Canal residents were relocated two years after unusually heavy rains resulted in noticeably contaminated ground water. The lack of statistically significant long-term ill effects is thus more likely due to low sample size and a relatively prompt action than a lack of danger. Similarly, the discussion of "estrogen" equivalence ignores questions of dose and uptake, multiplicity of target receptors, differences in persistence, nonlinearity or reversal of effect with dose, and a multitude of other factors.

Robert Clear
Berkeley, California

Terence Hines replies:

I agree that the results of the Leslie et al. paper don't reveal anything about vaccine effects. As to the Love Canal point, one can always argue that the observed period of time is too short to show deleterious effects. Two years seems to me to be long enough if the contamination at Love Canal was as horrible and dangerous as it's made out to be. And last but not least, of course there are multiple receptors, etc., regarding estrogen effects. It's always possible to say "you just didn't study the right factor" when confronted with a negative finding.

Promotion of 'FC' Appalling

Before my retirement in 1993, much of my work as a psychologist was in mental retardation and other developmental disabilities, which include autism. I was familiar with the promotion of facilitated communication (FC) by Douglas Biklin and Anne Donnellan, mentioned by James Randi in "The Farce Known as 'FC'" in the July/August 2017 SI. I recall reading, however, before retiring, the report of a study, published in a peer-reviewed journal, conclusively demonstrating that when facilitators were unaware of the questions being asked of the subjects for whom they were facilitating communication, the subjects were unable to answer them. As a result of many such studies, the American Association on Mental Retardation (which became in 2007 the American Association on Intellectual and Developmental Disabilities) announced that facilitated communication had no basis in science, and the American Psychological Association, American Speech-Hearing-Language Association, American Academy of Pediatrics, American Academy of Child and Adolescent Psychiatry, and American Psychiatric Association made similar announcements (https://en.wikipedia.org/wiki/Facilitated_communication).

It is appalling that nearly thirty years after FC was discredited as pseudoscience and fraud, it is still being promoted by two universities. There is, of course, increasing rejection and denial of science in our society, which is encouraged by the president of the United States, and which motivated the March for Science in April. Wikipedia relates FC to "alternative medicine" and the "paranormal."

Kenneth G. Crosby
Livingston, Texas

Don't Threaten Science's Objectivity

Some weeks ago, I listened on CSpan to a description by an economist of his own book titled (if I remember correctly) *Whose Side Are You On?* In his book, he showed that it was possible to produce diametrically opposite conclusions from the same financial data largely dependent upon the financial position of the reader. If one adds to financial considerations strong beliefs (e.g., religion) and cultural environment, the situation described by Matthew Nisbet in his column "The March for Science" (July/August 2017) could well fit into this framework.

The complicated business of politics is to negotiate agreements between groups with different interests with the object of finding a common way forward; the business of commerce and capitalism is to make money; the business of science is to collect data on the physical world, produce theories from the data, and make predictions based upon them. Any contamination of science with the first two of these activities threatens objectivity.

In principle, it is possible to separate scientific findings from the political discussion of how society handles them, and it would be prudent for the expert to avoid political discussion unless data is requested. There is no reason scientists generally should refrain from participating in the political debate providing they claim no special privilege as scientists.

If the conclusion of a scientific inquiry is well based, it should be presented. The way in which society deals with it is another matter.

Reginald Milborrow
Gulfport, Mississippi

Mammoth Cave Mysteries

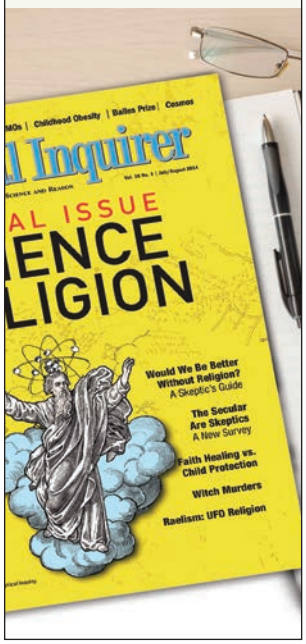
Joe Nickell's column about the ghost in Mammoth Cave (July/August 2017) reminded me of a couple of other spooky stories about the region. One is the mostly forgotten novel *Etidorhpa* by John Uri Lloyd (1895), in which an occult explorer is led by a mysterious creature on a search for Truth near the Mammoth Cave "punch-bowls." They enter the cave near Echo River, which is described as a miniature stream where there are "others more magnificent that flow majestically far, far beneath it." From there, it's a drop off story of the Hollow Earth guaranteed to put you to sleep.

The other Mammoth Cave story that comes to mind is "The Beast in the Cave" by horror story writer H.P. Lovecraft (1905). Written when Lovecraft was a teenager and not published in his lifetime, this story tells of a member of a tourist group visiting Mammoth Cave who leaves the party and gets lost. As he continues to wander in the dark, he begins to detect something following him and assumes it's a wild animal also trapped in the cave. Lovecraft is famous now for finding alien creatures under every rock and pond, but in this case it's something different. Typical of Lovecraft, the final words are intended to shock the reader so I won't spoil the surprise by revealing them here.

Neal Wilgus
Corrales, New Mexico

[FEEDBACK

The letters column is a forum on matters raised in previous issues. **Letters should be no longer than 225 words**. Due to the volume of letters we receive, not all can be published. Send letters as email text (not attachments) to letters@csicop.org. In the subject line, provide your surname and informative identification, e.g.: "Smith Letter on Jones evolution article." Include your name and address at the end of the letter. You may also mail your letter to the editor to 944 Deer Dr. NE, Albuquerque, NM 87122.



cated explanations! As Gardner says, it is far more likely that his raw data were inaccurate.

The editing of this book is decidedly poor, with many oddities of punctuation, wording, and spelling, and it is not clear whether they are in the originals (in which case this should be indicated) or are transcription errors; the index is almost useless: there are only two references to Gauquelin (one misspelt "Gauguelin"), who is actually mentioned in hundreds of letters, two each to Klass, Carl Sagan, and Targ, and three each to Velikovsky, Geller, Puthoff, and Kurtz, all of whom are also in fact mentioned many times.

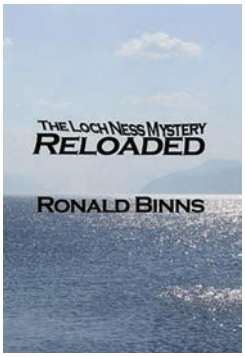
The book is a treasure-trove of apposite comments on many well-known people and claimed phenomena.

The book is a treasure-trove of apposite comments on many well-known people and claimed phenomena, and it is a pity that they will so often be untraceable because of the poor indexing. It is also brave to publish very blunt remarks about people such as Geller and von Däniken ("an outright charlatan") who are still alive. This is an indubitably valuable book, but its value could have been greatly enhanced by better editing and indexing.

Ray Ward is retired and lives in London after a career in library work. He has a BA in politics and a long-term interest in paranormal claims. He has reviewed books in the field for British skeptic publications.

Loch Ness Solved—Even More Fully!

JOE NICKELL



The Loch Ness Mystery Reloaded. By Ronald Binns. Zoilus Press, London, UK, 2017. ISBN 9781999735906. 222 pp. Paperback, £12.

With his new book, *The Loch Ness Mystery Reloaded*, Ronald Binns takes another bow as the man who cast the net and drew up from the depths the ultimate truth about the fabled creature, Nessie.

Binns is himself a distinctive creature: He began as a believer—once a member of the Loch Ness Phenomena Investigation Bureau—but evolved into the author of what I have called the definitive, skeptical book on the subject.

In that book, *The Loch Ness Mystery Solved* (1983), Binns did what no one had troubled to do in the previous half-century of monster history: He pored over the 1933 files of the *Inverness Courier* and illuminated the earliest sightings of that monster-inaugurating year. His search revealed not only "that there had always been a local skeptic counter narrative" but also that there had been no sightings for the previous half century. Moreover, one Alex Campbell had been responsible for virtually inventing the monster—the first to publicize it, continuously hype it, and, eventually, claim to have been an eyewitness on no fewer than eighteen occasions (Binns 2017, pp. 10–11, 36–37). But Binns was only getting started.

He does not consider *Reloaded* a sequel to *Solved*. Emphasizing that his "view of the monster has not changed since 1983" (p. vi), he has produced neither a rewrite nor a sequel. Instead, he has absorbed the new information that has come to light—for example, that the famous 1934 image of Nessie known as "the surgeon's photograph" was a hoax using a small model—and so has updated and added to the classic cases.

Of course he can say "I told you so" in the 1934 case since he had anticipated the solution—even having produced his own fake photo using a model of about the same size. "This turns out to have been an amazingly percipient piece of guesswork," writes Binns (66), but I think of it as real detective work by one with an excellent eye and judgment.

In *Reloaded*, Binns analyzes at length—and deconstructs—the classic Nessie sightings. In doing so, he frequently refers to what Rupert T. Gould (in his *The Loch Ness Monster and Others*, 1976, 112–113) called "expectant attention"—that is, the tendency of people to be misled by their own expectations. Binns insists (repeating it nearly verbatim later),

Continued on p.62

Everything Happens for THE Reason

By Ian Harris

I am very excited to be writing for the Skeptical Inquirer. I have been a subscriber and fan for over twenty-five years. Being a "skeptic comedian"—or a stand-up comic who promotes skepticism in his act, turning my jokes and thoughts into humorous mini-essays—has always been a goal of mine. Perhaps one day I'll even turn them into a book.

While I love the idea of being responsible for my future, creating a path and sticking to it, and having things fall into place after years of working toward them (and even just the idea of plain old "happenstance"), I loathe when people chirp, "See, everything happens for a reason!" Living in California, I have plenty of New Age, unrelentingly "positive" people in my life, and that is great, but this idea assumes some sort of external pre-thought, some magical force, or predetermined outcome in life. Now, I understand cause and effect; like if I don't apply the brakes, I will hit the car in front of me. But that is not what they mean by this. They mean it in some sort of grandiose "Someone is watching out for me" way.

I have heard countless stories from friends, practically throwing their backs out bending over backward to find a hidden "reason" for something. Every story sounds like this:

> I lost my job, bro. Yeah, I woke up late the other day, because my alarm didn't go off! Every day it goes off like clockwork or something, but this day . . . nothing! No reason; just didn't go off. So then I couldn't find my shoes. Finally found them in the bathtub! How'd they get in there? When I got home from the bar the night before they were on my feet, and I was still in my clothes, so I know I didn't take a shower. . . . Anyway, I eventually get to my car and realized I left my keys in the house. So I had to break into my house to get my keys. I finally get to my car and on the freeway, and BOOM! A huge fifty-car pile up . . . twenty people dead. That's when I realized if I had been on time, I would have been in the middle of that—and I'd be dead! Someone was looking out for me. So yeah, I lost my job, but I'm alive! Everything happens for a reason.

Yeah because if I am a god and I don't want you to die in a horrific car wreck—because the world can't afford to lose another good Denny's waiter—that's what I am going to do: hide your keys to delay you for five minutes. As an all-loving, omnipotent god it would never occur to me that an easier way might be to just . . . oh I don't know . . . *not* murder twenty people on the freeway that day! What about those people? Everything happens for a reason? Maybe twenty people died on the freeway today because you left your keys at home, you jerk!

I actually love the idea of everything happening for a reason. I think it would be great if everything happened for the *same* reason. Then after sporting events we could hear speeches like:

> My first Super Bowl win! This is incredible. Before I go any further, I need to thank the man responsible for this win. That's right . . . that unemployed waiter guy, Bodhi! Because if he hadn't lost his keys that day, none of this would have been possible. And to our opponents: Hey I know it would have been better if Bodhi *hadn't* lost his keys that day, but I know you guys will go home, work harder, and come back stronger next year. Just remember: everything happens for *the* reason.

I can't think of a way to end this piece—must have something to do with those damn lost keys.

Ian Harris is a Los Angeles–based skeptic and standup comic.

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